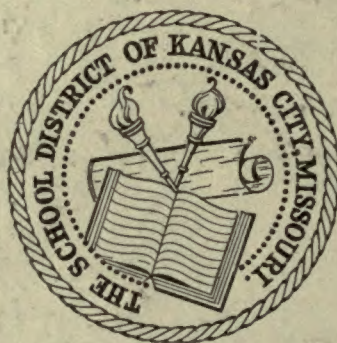


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The Reclamation Record

Issued Monthly by the RECLAMATION SERVICE, DEPARTMENT OF THE INTERIOR, Washington, D. C.

VOLUME 14, No. 1

Price: 75 cents per year

JANUARY, 1923

PROSPECTS FOR AGRICULTURE IN 1923.

UNDER the above caption the Secretary of Agriculture, Hon. Henry C. Wallace, presents the following optimistic survey of present conditions and prospects for the new year:

"Twelve months ago most of the 6,000,000 farmers of the United States were starting on the long hard climb out of the valley of economic depression. They have not yet attained the heights which awaited in the grateful sunshine of prosperity. Some, indeed, have fallen by the way. Others are still in the valley. Nevertheless, as we stop a bit and look backward we can see that very considerable ground has been gained by the great majority, and we can enter the new year with renewed hope and with that courage which comes from the realization that we are really making progress.

"A year ago, when speaking of the prospects for farming in 1922, I said that while there was no reason to expect boom times for the farmer in the near future, there was promise of better times, both for the farmer and for those whose business is largely dependant upon him. The year has brought fulfillment of that promise. Speaking generally, times are better, much better, than a year ago, both for agriculture and for industry.

"Crops have been good, on the whole. Prices of the major crops are mostly considerably higher. While there has been a corresponding advance in the prices of the things the farmer must buy, the total sum which farmers will receive for the crops of this year is greater by a billion and a half dollars or more than that which they received for the crops of last year. This will certainly mean better times on the farm, and farm folks will be able to ease up a little on the grinding economy they were forced to practice the preceding year.

"The labor cost of producing crops of 1922 was still further reduced. There were some substantial reductions in freight rates. Much helpful legislation has been enacted and more will be this winter. Interest rates are lower and the credit strain has been eased. This has made it possible for many farmers who were rather heavily involved to refund their obligations and get themselves in condition to win through.

"There are still some dark spots. In some sections weather conditions were unfavorable and crops were short, and farmers in these sections are having a very hard time of it. Freight rates are still too high, especially for those who must pay for a long haul to market.

"Taxes are high, but this is largely due to the increase in local taxes, over which farmers themselves must exercise control.

"There has been gratifying growth in farmers' cooperative marketing associations, and more of them are being organized on a sound business basis.

"Aside from the help which has been given by legislation and by administration activities, strong economic forces are at work to restore a more normal relation between agriculture and other industries.

"The peril in the agricultural depression is more keenly realized by other groups than ever before, and on every hand a sincere desire is being evidenced to do what can be done safely to help the farmer better his condition.

"Everything considered, we have good reason to expect still better things for agriculture in the year 1923."

That the above optimistic outlook of the Department of Agriculture is especially applicable to the irrigation projects of the Reclamation Service is indicated by the following quotation from a recent letter from Secretary Wallace:

"I do not have that personal knowledge of conditions on these projects which enables me to answer you with the degree of directness which I would like. I may say, however, that so far as I have been able to get at the situation, the financial distress among farmers on these projects is no greater than the financial distress of farmers not on reclamation projects throughout the region from the Missouri River west. In that region there are large sections in which I have no doubt agricultural distress is greater than on the reclamation projects."

A STRAIGHT-FROM-THE-SHOULDER TALK

By George W. Sturm, President, Orland Unit Water Users' Association,
Orland Project, Calif.

THE agitation from some of the projects to have the payment of the construction and operation and maintenance charges extended has had a bad effect on the local project, as the spread of this propaganda here has made it harder to collect these charges. It is a well-known fact that many people these times take advantage of most anything to get out of making their payments on time.

We have many on this project also that plead poverty and some that have no right to whatsoever. As a matter of fact, some that do most of the kicking about payments or for an extension of time of payment never stop to consider that they might save a good portion of these payments by buying less gasoline and tires for joyrides. It appears to me that the quicker we get right down to brass tacks and honestly endeavor to meet our payments, the better it will be for this country as a whole.

It might pinch us just a bit to make these payments, but we must deny ourselves some of the luxuries that we seem to think are necessities of life. We should cut out some of our extravagance, and it will not be much trouble to make our payments to the Government.

However, there is one class of settlers that are really to be pitied, and that is the class that has been landed on some of our lands by real estate men and told how easy it is to make a living on a ranch. It is a mistake to sell any man land on a shoestring and make him believe he can get by, just for the sake of a small commission. It is not a mistake; it should be a crime and punishable as such. Even through the balmy times of the war it could not be done; far less now. A real farmer would not fall for such "get-rich-quick" stuff in the ranching game. It matters not whether a man has paid half cash for land or bought it on a shoestring if he does not get by. He blames the land, the weather, or some other circumstance, as a result of which he seems to think he has not had a fair deal, when it is a fact that the man who buys on a shoestring has so little chance to win.

The trouble is that we did not take time to figure the cost accurately, even if we had the figures at our disposal. We all knew what the costs were, or they ought to have been the first thing we found out. If we were dealing with a corporation and had to pay interest on our deferred payments, would there be so much agitation for an extension of time?

HONOR ROLL.

Continuing the policy of the last two months of printing in the RECLAMATION RECORD the names of those water users who have been most conspicuous in the matter of repayment of charges, thus permitting the use of this money again as contemplated by the revolving nature of the reclamation fund, we are glad to print the names of the following two water users on the Huntley project, Montana, who have made advance payment in full of their original and supplemental construction charges:

Willson J. Aesdale, Mound City, Mo.

A. L. and T. T. Makinson, Worden, Mont.

On January 4 Director Davis sent the following telegram to Project Manager Weber, of the Orland project, California:

"Please convey to water users' association my congratulations and hearty thanks for the prompt payment in full of operation and maintenance charges due. I can not adequately express my appreciation of the efforts the association has made to maintain its proud record of primacy in prompt payment."

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SHORT STORIES OF SUCCESSFUL SETTLERS

Gathered from the Project Press and People

By C. J. Blanchard, Statistician.

NEBRASKA seed potatoes have won a prominent position in the markets during the past few years. Last season 700 cars were shipped from western Nebraska where high elevation and cool nights favor the growing of first-grade seed potatoes. The Nebraska product is especially favored by reason of its comparative freedom from diseases which trouble southern States, where much of this seed is used. Some of the varieties are sold in Colorado, particularly the Russet Rural. The Bliss Triumph seed dominates the markets of Texas, Louisiana, Oklahoma, Kansas, and Arkansas. Prices this year largely favored this type. November sales were made f. o. b. \$1 to \$1.40 per 100 pounds sacked. In December 30 cars of certified seed sold at prices ranging from \$1.77 to \$2 per 100 pounds. The premium for certified stock over No. 1 table stock ranges from 60 cents to \$1 per 100 pounds, and this year represented the difference between a net loss and a fair profit.

The oft-repeated statement that the development of a reclamation project is of direct benefit to sections remote therefrom is exemplified in the Salt River Valley, where the cantaloupes are grown from seed purchased in Colorado.

Our news notes in recent issues have furnished convincing evidence that the cow, pig, and the hen are mortgage lifters and prosperity bringers. The quickening of development on most of our projects is observable almost at once after the farmers turn their attention to these profit makers. The monthly cream checks, the semiannual sale of pork, and the weekly sales of eggs furnish the ready coin for current bills and augment the bank account.

It is indeed cheering to read the project papers this month. The new year is ushered in with evidences of a renewal of hope and optimism on most of the projects. Farmers as a rule are looking forward. They are taking counsel among themselves, discussing with the Government agents plans for better farming methods and marketing. An inventory of last year's work has revealed the weaknesses of some of the methods followed and large numbers of farmers, profiting by experience, are arranging this season's work along lines which are practical and sound.

Waste is to be eliminated, rigid thrift must and will be practiced, and the examples of practical farmers will be more closely followed than heretofore. With the reduction in our surplus of food products,

prices are stiffening, the market is broadening. On a number of the projects the organizations recently formed for the purpose of colonizing the unused lands are reporting a revival of interest in farm lands and the coming of actual settlers.

Conservative and truthful publicity is responsible for this. The activities of these organizations have been beneficial, too, in creating a more cheerful atmosphere among the farmers, who are cooperating in this effort.

While it can not be denied that many of our farmers have a long hill to climb before their journey back to easy times is accomplished, the last 60 days have shown a decided improvement in financial conditions, which predicates steady progress toward prosperity. At any rate the period of hysteria is about over. Pluck and industry will pull most of the farmers through if they are willing to profit by experience and counsel and stick to the job.

The hard-luck stories put out by some of the projects, while undoubtedly true, will retard seriously any attempt to bring settlers. A few of the projects have such bad advertising that recovery is bound to be slow.

The following remedies are suggested for the alleviation of agricultural depression: Better prices, lower freight rates, reduction of overhead charges, lower interest rates, longer time loans, cooperative marketing and production.

During the month of December the statistician delivered lectures before the following organizations: Trowel Club, Women's City Club, and the University Club, of Washington, D. C., and the Consolidated Granges of Southern Maryland, and during January addressed the following: Bronx Public School No. 54, New York City, 2 engagements; Boys' High School, Brooklyn, N. Y., 2 engagements; Dartmouth College, Hanover, N. H.; Woman's Guild, St. Andrew's Church, New York City, 3 engagements; Community Club, Waterford, Va.; Catholic Club, New York City; National Arts Club, New York City; Union League Club, New York City; New Century Club, Newtown Square, Pa.; Commercial Museum, Philadelphia, Pa.

Commissioner General Collier, at the Brazilian Exposition, reports that the motion picture films of the Department of the Interior are making a hit. The Reclamation Service's contribution to the show consists of 10 reels with scenes from nearly every one of the projects.

What Others Have Done You Can Do.

Salt River project, Arizona.—Phoenix, the metropolis of Arizona and the focal center of the leading industrial activities of the project, maintains her phenomenal progress. The city directory just issued indicates an increase of 12 per cent in population during the year 1922. As a further evidence of her growth the Post Office Department reports the city as showing the fourth largest gain in the postal receipts in the United States, nearly 30 per cent in November. Phoenix now ranks ahead of Manchester, N. H., and Lexington, Ky.

The work of widening and rebuilding the Apache Trail highway between Roosevelt and Mesa is now nearing completion. This work has been in progress since last spring, with two and three different camps of the Arizona highway department carrying on the reconstruction of this famous old trail.

The power developed by the Salt River project in Arizona brought the associated land owners under the project \$609,000 this past year. In addition electric power of 12,000,000 kilowatt-hours was consumed by the association in operating its own power plants. It is said that there is a market for six times the power now available within easy reach of the system.

Orland project, California.—Representatives of the Sunmaid Raisin Co., after an investigation of the project, expressed themselves as satisfied that Orland is destined to become a grape producing country of importance, and predicted good things for the industry here.

Another 40 acres of orchard was assured for immediate planting on the Orland project this week, when H. Johnson, of San Francisco, made the purchase of the Siri Bros. ranch west of town. The land lies about 2½ miles west from Orland, opposite the McAllister ranch, and is already partially improved.

Eighty thousand pounds of dressed turkeys, 40 tons, went out from Orland, bound for the holiday trade in the cities. Turkeys in small shipments had been going out every day for a week or more, but the two big days brought the seasonal shipments up to a total that is well ahead of any other shipping point in the valley.

The average price paid at this point for the birds was about 35 cents, bringing the local growers about \$28,000. The shipments made during the Thanksgiving season amounted to about the same figure. If the total value of the year's output could be figured, it is believed the aggregate would not be far from \$80,000 or \$85,000, which is a considerable amount to bring into circulation in this community.

Uncompahgre project, Colorado.—If there is any doubt in the minds of anyone that Delta County can not raise pork, the following item will be of much interest: Charles Burbridge, who lives on Garnet Mesa, butchered a hog which weighed, after being dressed, 534 pounds. Nute Whitener, of Olathe, did not forget how to raise hogs when he left Missouri. The morning agricultural class, with their teacher, Professor Wilson, helped him butcher a hog which weighed 502 pounds dressed.

Delta County banks, 10 in number, at the close of business December 29, showed resources of \$3,235,169.53, and deposits of \$2,563,836.92. There are no large cities in the county, the chief industries being farming and stock raising.

Thousands of sacks of spuds are being fed to hogs in and around Montrose this winter. The cooking and feeding of potatoes to hogs has assumed enormous proportions. Several cars of feeder hogs have been shipped in here from Dolores and are being fattened on the local potatoes, for which there is little or no market.

Minidoka project, Idaho.—Ten cars of sheep, 2,600 in number, were shipped east out of Paul the latter part of December to the market by Acuff Bros. The sheep had been fattened on their place in the Pioneer district. A special engine was sent down from Minidoka to take care of the shipment.

The Amalgamated Sugar Co. sprung an agreeable surprise on the beet growers of this section recently by announcing a bonus of 75 cents per ton on this year's beets to be paid at once. By this move beet growers in Minidoka County will be paid \$16,500, the money coming, as it does, unexpectedly, being joyfully received.

With this bonus growers will have received \$6.25 per ton for their beets, with additional bonuses in prospect. Realizing that the bonus to the growers will be more than this amount, the company declared this dividend to all the growers in Idaho and Utah, although a greater part of the sugar made from the beets is still unsold.

Beets in this county were the best ever raised here, according to R. C. May, field agriculturist, with those in the Rupert district averaging 14 tons per acre and a general average of 13 tons for the county.

According to Mr. May it may be expected that the average yields for this county increase each year as the beet growers become more familiar with the industry.

Three hundred dozen, 3,600 eggs, from 200 hens, in December!

Some eggs, you'll say, but that is what the 200 White Leghorns belonging to Ernest Jullion, whose poultry yard is three-quarters of a mile from the Pershing School, are now averaging and are expected to accomplish during this month.

Up to this time the 200 hens are ahead of this average for the month. High day since December 1 was 137 eggs with the thermometer hovering around zero, with 130 a day being the common run.

Entering the poultry game early last spring, Mr. Jullion built a poultry house 23 by 30 feet, of the half monitor type. He sent to Oregon for 500 baby chicks. Out of this bunch he raised 450. He sold cockerels and kept 200 pullets, after culling out the poorer ones.

"I am marketing 10 dozen eggs daily, at 40 cents per dozen, and expect to average this for the month, unless the weather gets too cold, say 20 below, which might frostbite the combs of my hens and interfere with their laying," says Mr. Jullion.

"There is no reason why the poultry business shouldn't be a profitable one here, and I am going to extend my operations. I expect to build another house and get at least 500 more baby chicks in the spring."

According to the poultryman it takes \$1.25 per day to feed the 200 birds properly.

Thirty-three head of good Jersey milch cows—a full carload—arrived in Rupert a short time ago from Tillamook, Wash., to be distributed over the

Rupert district to farmers wishing more dairy stock. The shipment, good grade stuff, was made by S. R. Johnson.

That half a dozen or more cheese factories will be in operation in this part of the State before the 1st of May is word coming from F. W. Laabs, Curtiss, Wis., cheese maker, here recently looking over the situation regarding the starting of one in Rupert and Paul. He was sent to this part of the State by J. L. Kraft, Chicago.

Things move fast on the Minidoka project. Just a short time ago Rupert was a village of shacks in the midst of the sagebrush. To-day it is one of the attractive towns of the West, modern to its finger tips. Beginning with the New Year Rupert joins the city class with 2 mail carriers making 2 daily deliveries.

The officers of the irrigation district announce everything in readiness to start bringing in the new settlers except the land listing. Personally we do not regard it as wise to begin a publicity campaign without a good list of property and on long options. A few sales in the beginning will surely tend to stiffen prices, and this will retard future sales. The organization has worked out a good plan, it deserves generous support, and of course is dependent upon this for success.

Flathead (Indian) project, Montana.—C. W. Fowler, manager of the recently organized Montana Mutual Dairy Loan Association, which has for its purpose the financing of the dairy industry, points out the fact that although times are generally hard, in dairying communities conditions are better than anywhere else, indicating that this industry is a substantial and successful branch of agriculture.

There seems to be no question that the dairy sections of the United States are in better shape than other farming communities, and since there is every advantage in this country for the dairy business, it is logical to conclude that the best bet for Flathead Valley is the development of the dairy industry.

A start has already been made. Many farmers are now engaged in dairying and already some fine dairy herds have been established in the valley. Any concerted movement to encourage the further development of this industry here should have the support of the entire community.

Newlands project, Nevada.—Fernley farmers have contracted to plant 135 acres in cantaloupes for the American Fruit Growers (Inc.), of Pittsburgh. Fallon is planning to plant from 500 to 1,000 acres in the same crop.

Investigation of the value of alfalfa fed to dairy cows made by the agriculturist shows that Fallon dairymen received about \$21.52 per ton with butter fat selling at 48.2 cents per pound.

The cream checks received by project farmers in December totaled \$39,114, and this is the lowest month of production. This indicates that dairying has become the most important industry of the project. This condition has been attained within the past few years and is largely due to the indefatigable efforts of Agriculturist L. E. Cline, backed by the generous support of George Wingfield and a few others.

From now on the calamity howlers who once held forth on street corners and scared homeseekers off the project will find no listeners. The dairy cow is the harbinger of profitable and permanent farming, and the dairy farmer has no time for street oratory. In 1924 the dairy population is likely to reach 5,000,

and the increase in butter fat production will exceed 50 per cent. Our predictions for Lahontan's valley are all coming true.

The second cooperative shipment of hogs was made on December 5. There were 92 hogs included in this shipment, and 19 different farmers were accommodated. The hogs shipped averaged well in condition. About one third of the number, however, were too large to bring the highest prices. The prices received for the last shipment were 9½ cents for hogs weighing 125 to 200 pounds; 9 cents for hogs weighing from 200 to 250 pounds; 8 cents for hogs weighing 250 to 300 pounds; and 7 cents for hogs weighing 300 pounds and over. This last price was also paid for rough sows and stags.

The time has passed when heavy hogs command a good price. The consumption of vegetable oils has replaced to a considerable extent the animal fats, so that the demand now is for a larger proportion of lean meat in the dressed carcass. An average weight of 175 pounds seems to be preferred.

It is fortunate for the producers that lighter weight meat animals are preferred because of the greater net profit in producing them. The cost in the production of pork increases very rapidly as the weight increases. The summary of a large number of feeding tests shows that it requires approximately 30 per cent more feed to produce a pound increase in weight on a 250-pound hog than for a 100-pound hog. When this is taken into consideration, together with the fact that heavy hogs command a smaller price, it is easy to see that the small hog is the profitable one.

Rio Grande project, New Mexico-Texas.—Eighteen hundred farms in Dona Ana County this year produced crops of an estimated value of \$1,800,220 as compared with crops valued at \$1,406,358 grown on 1,650 farms in 1921. The area in crops increased 1,382 acres in the past year. Reckoned in the crop statistics hay comes first with \$750,380; garden truck \$200,000; corn and other cereals \$272,420; cotton \$192,000; cantaloupes \$136,500; beans \$45,000; fruits \$58,200; sweet potatoes \$39,000; cabbages \$27,600.

The Farm Bureau reports a lively interest in project lands with excellent prospects of numerous transfers this season. Colonizers from Canada and one from Italy are planning to visit the valley soon for the purpose of locating several hundred settlers. The excellent publicity the bureau has given the project is bearing fruit. The outstanding thing in the settlement and development program is that it is resultful—the direct means of bridging the gap between the landless man and the manless land. So far as we have been able to ascertain no man interested in this district through advertisements, publicity matter, and correspondence issued by authority of the three organizations has been disappointed in what he found in the valley or has criticised the statements made concerning the resources. "Say it with facts" is the bureau slogan.

A. P. Coles & Bros. have rented 700 acres of valley lands to cotton growers, which should mean the production of as many bales of cotton next year, above this year's production, and at the present price of the staple the crop should be worth \$87,500.

Four hundred acres near La Mesa, N. Mex., have been rented to W. H. Lee, cotton farmer from Barstow. Several families of experienced cotton raisers will come here from the same section to help Mr. Lee cultivate the acreage. Coles Bros. will get a third of the production

One hundred acres near Canutillo and 200 between El Paso and Ysleta have been rented. Coles Bros. will furnish everything for the cultivation of these ranches and will get half of the production.

The Ysleta ranch is all new acreage. Coles Bros. have spent \$4,000 to clear the land.

Virgil H. Hunt, cotton farmer of Fabens, has purchased from J. H. Rogers 140 acres of island land for \$10,500.

Hubert M. Cameron has purchased from J. H. Heald 6.5 acres of Ysleta land for \$2,500.

Mr. Hunt sold one-third undivided interest in surveys 105, 106, and 108, San Elizario grant, 221.5 acres, to T. A. O' Cain for \$32,400.

Umatilla project, Oregon.—Beekeepers have decided to pool all the wax of the members and send it to a manufacturer from whom a special rate has been received for making the wax into foundation. This shipment will likely contain about 4,000 pounds of wax.

County Agent Fred Bennion briefly outlined program for apilary work planned by the extension service for the coming year. It is likely that one or two experiment apiaries will be established in this county, and several field meetings are also planned.

Okanogan project, Washington.—Looking at the near future of Okanogan County and summing up from the development and prospects of the past 14 years, 1923 can not help being the most wonderful period this natural wonderland has ever seen.

In the Omak community the prosperity wave is carrying itself in high gear, while those on the ground are doing their best to keep pace and welcoming each day's newcomers with a glad hand. The large revenue producers to date, the orchards, were never in better shape to deliver a great crop of apples. New business concerns are taking advantage of the slower winter months to become established. Plans for new business blocks and homes are being made. Railway building will be started up the Omak Creek Valley. The J. C. Biles Lumber Co. will be starting its larger timber operations. The Bennett Box & Lumber Co., of Disautel, has large plans and will continue its progressive strides. Strongly financed mining interests at Nespelem are making arrangements to meet the Omak Creek developments so they can ship their paying ore from the Omak station, and those best informed state the entire Nespelem Valley will wake up and send thousands of dollars worth of farm products out this way in ever-increasing lots.

Yakima project, Washington.—Agricultural production in Yakima County was probably greater in 1922 than in any preceding year. The value of products was not as great, however, as in years when less stuff has been grown. The decrease in values is, of course, a serious matter. It represents many new homes and automobiles. It means much loss of employment and less business for everybody. However, no one need suppose that this valley has encountered serious calamity as a result of lower prices. There are some instances where good men have gone under, perhaps; but on the other hand, not a few farmers have made quite satisfactory profits on their season's work. The bankers may tell you they are carrying over some of their customers; but most any of them will also tell you of scores of cases where farmers have paid in full and have balances left. Most any of them will tell you that there is still investment money in the country, and that the farming community, even if it is not highly pleased with the year's

work, is not by any means downhearted. Twenty-eight millions is a lot of money for a population of 65,000 to take in in a single season for its products, and with conditions everywhere else improving, and prospects here thus becoming brighter all the time, we do not need to have much fear of the future.

Sunnyside boys interested in better swine and dairy cows include: Philip Hitchcock, whose pigs brought him in a profit this year of \$200.90, as reported to the extension service of the State college in his boys' and girls' club work.

Howard Bagley made \$143.18 on his hog venture this year. Howard is an old hand at this work, having won the State pig club championship in 1920 and the interstate championship in 1921. He has been a successful pig club boy for the past three years.

Philip Hitchcock has also started in the dairy club work, having a pure-bred calf, but as yet it is too early to know what he will make.

Ray Banks, of Selah made \$162.64 on his pigs this year.

Hatching chickens by electricity is the latest development on the big poultry ranch operated by John Moorhead near Granger.

Moorhead is having a mammoth electric incubator installed on the place, the installation work being done by Real Lichty. In order that interruptions of service may not spoil a hatch, Moorhead will have his own power plant by means of which he will heat and light the incubator and brood rooms and other buildings of his poultry plant. Seven ventilator fans are to be part of the equipment of the big incubator, which will establish a record for the Yakima Valley.

How many rows may an ear of corn have is a question which occurred to H. C. Davis, a year ago, and while he did not fancy that it would be an advantage to increase the number of rows and the size of the cob with it, he thought it would be interesting to see what might happen. He, therefore, picked a number of ears with the highest number or rows, some of them having 24. Planting seed from these ears, he this year got lots of ears that run 26, 28, and 30 rows to the ear and even 32 rows to the ear. How many rows one might ultimately get by planting the 30 and 32 rows ears, he leaves anyone interested in the experiment to conjecture. In his mind he has decided that it would not be worth while to follow up that proposition.

He grew Reed's Yellow Dent, and relative to the number of rows said that 20 rows is the standard for the variety though 18 rows are admissible. His 30 and 32 row ears naturally had a somewhat larger cob than he thinks desirable.

New Year's Greeting to the Employees of the Reclamation Service.

I wish to express to each member of the Reclamation Service family my high appreciation of their loyalty and devotion to duty during 1922, my faith in their continued cooperation in the interests of the Reclamation Service and the water users, and my heartiest personal best wishes for a happy and successful New Year in our chosen work.—Arthur P. Davis, Director.

HINTS FROM PRACTICAL FARMERS.

Practical Suggestions for Poultry Farmers.

By H. O. Numbers, Loretto, Pa.

IF YOU have not laid the foundation for your young stock production this season, you undoubtedly are considering the purchase of either matured breeders, day-old chicks, or hatching eggs.

If you intend hatching from your own stock, you should have all your pens properly mated.

If you contemplate the purchase of either breeding stock, day-old chicks, or hatching eggs, "proceed with caution." The poultry periodicals are full of seemingly attractive propositions. Right here, let me make a declaration, that I know of no industry whereby the truth can be more perverted, the advertising more alluring, the represented facts so misleading, the deception so subtle, as the poultry business. Our poultry associations are struggling today to suppress the unscrupulous, but until we have fixed standards and guaranteed qualities protected by national laws, fraud will continue. Let me illustrate to bear out my statement. I have been the victim of an alluring and glowing advertisement. The circumstances are herewith presented. Some time past, I required a special strain for our breeding purposes. Not being in a position to call personally and select my stock, I left an order to be filled by the owner for a pen of birds, none to be less than 260-egg records, and a male bird that would win in competition. The price was over \$200. The birds arrived in a fancy shipping crate, all bedecked with attractive posters announcing "the shipper's high quality of stock, etc." Two of the hens had abdominal trouble. One had an infection of the crop, a chronic condition that had been temporarily "fixed." Three of the hens laid malformed eggs. The other four were nothing but plain culls. I received less than 100 eggs from this pen of 10 hens in one year. The male bird was a freak of its variety. My space is too limited to describe in detail; however, I bred and hatched a few eggs, in the hope that the posterity might show up some good qualities. In brief, the youngsters were the worst mongrels I have ever seen. No shape, no color, in fact, no merits. I killed the cock bird to avoid answering questions from inquisitive visitors as to "what variety he represented." Only seven of the hens were fit for table use, as the three afflicted birds, by reason of their ailments, were consigned to the fire and burned. Beautiful pedigree forms, all embossed in gold, accompanied the birds. I am in a position to question the authenticity of these records, and feel qualified to do so. Like many other

dealers, he uses the past reputation of a few phenomenal hens as an advertising medium. His flock is run down in vitality, and when he receives orders by mail he goes out in the country and buys stock from the near-by farmers to fill out. I have also received some wonderful literature from him since, telling me how to get rich quick on a back-yard flock. All his own handiwork.

A lady last year bought by mail a Rhode Island Red cock bird. She paid \$10. A poultry expert was called in to judge his value. He found him to be nothing but a cheap cull, worth only meat price; however, the lady in question said she "had paid \$10 for the rooster, and she must realize some money back." She mated the cock to a pen of her own hens, and during the summer she sold off several cockerels at \$5 each, to unsuspecting buyers. In the fall she called in the poultry expert again to see if he couldn't find some \$10 cockerels in the flock, as she had sold only the poorest of the hatch. Not one could be found. And yet she continued to sell off cockerels, and realized as much as \$10 each. She sold her stock to people who were not familiar with the qualifications of this breed. Her conscience did not hurt her, because *she* paid \$10 for the sire.

The day old chick business is growing every year, because "Barnum" has more followers each year. A common practice among some hatcheries is to force their hens, and to hatch from pullets. Of course they get lots of chicks, but they do not live.

The same applies to hatching eggs. Hens and pullets are forced under lights, and by force feeding for record output. And you, a novice at the game, "fall" for attractive advertising.

There are honorable dealers, but their "way is hard." They must have a little more for their product than the fraud; hence they labor under a handicap.

A number of periodicals are printed merely for the advertising matter they can secure, without regard to the soundness of the advertiser. So "proceed with caution" when you subscribe, and remember that anything you may receive "free" may be expensive to you in the end. If you find your wants in a reputable paper, consult the editor first before you buy, as to his knowledge of the advertiser. Any good publisher will stand back of his advertisements.

Just a word in reference to the advertised "heavy laying strains." In California, Florida, and sections of similar climate, hens will lay at least 50 eggs per year more than our northern or temperate climate fowls. The flock that will average 200 eggs per hen per year is a paying proposition. My trap nests reveal marvelous facts. Do you realize that the normal hen lays only 10 months out of the year?

Calculate for yourself her daily yield to produce 300 or more eggs per year. Of course there are a few monstrosities in every flock, but I prefer to breed from normal hens, and stay in the business.

My one thought in this article is to convey to you the importance of deliberate consideration before you throw your money away on inferior stock. Thousands of people annually "get stung" and then denounce the entire poultry industry as fraudulent.

How to Make \$1,000 a Day.

By John Montgomery, Livestock Specialist, Minidoka Project, Idaho.

Five or six years ago the Minidoka project was shipping about one carload of hogs per day. The hog population of the project steadily decreased from that time. During our engagement in the World War, grain prices were so high that farmers felt unable to stick to their live-stock programs with the result that at the present time the swine population and the farm sheep population of the project are far below a normal figure.

At present market prices an average car of hogs is worth in the neighborhood of \$1,000. One thousand dollars a day distributed among project farmers would be a neat little income this year.

Increasing interest in swine production indicates that a number of farmers realize their mistake in disposing of their swine-breeding stock. There is still ample time for each farmer to secure some bred gilts for spring litters. It is to be hoped that when marketing time comes next year the Minidoka project will be furnishing a reasonable quota of pigs and lambs.

Any reasonably good pig makes his master money this year but more modern types will grow larger in the same length of time and make their owners more money. There is always room for improvement in live-stock breeding. The histories of the large shows like the Pacific International, the Royal at Kansas City, and the International at Chicago, are narratives of constant improvement. The grand champion steer at this year's show is acknowledged the finest steer ever shown there and so with the swine.

Once in a great while breed clubs run to fads and injure the breed with which they are working, but not often. So long as the object of the breeder is more pounds of meat in a given period and the same grades with less feed, the live-stock industry is making progress in a practical way. The one human value in making mistakes is to teach us not to make the same one again. We certainly need that \$1,000 a day from pork raisers on the project. There is just one way to profit by the mistake we made in

closing out the breeding stock, and that is to start again with a few animals of the right type and stick with the business. The pig has lifted more mortgages in the United States than any other single farm animal. "Nuf sed."—*Minidoka County News*.

Okanogan Project Scores at North Pacific Fruit Exposition

By Calvin Casteel, Project Manager.

The North Pacific Fruit Exposition, held in Seattle during the week ending November 18, 1922, is the same exposition at which the Okanogan project made such a good showing a year ago, and it is gratifying to note that the number of prizes taken this year was greater than a year ago in proportion to the number of exhibits. The project did not attempt a community exhibit, but gave their energies toward getting up and displaying exhibits from the 10-box class to the plate exhibits of apples of various kinds.

In the 10-box class exhibit, 9 first prizes and 1 second were awarded on the 10 entries from the project. In the 5-box exhibit the 12 entries won 7 firsts, 4 seconds, and 1 third. In the 1-box exhibit 15 entries were made, and 11 firsts and 4 seconds were awarded. In the plate exhibit the number of entries was not given, but 11 awards were made to the project exhibitors. This makes a total of 48 awards, and in addition to winning these ribbons a total of \$847 in cash prizes was awarded. The cup and \$100 offered by Steinhart & Kelly, of New York, for the community winning the largest number of prizes was again awarded to the Okanogan project exhibits. If this project can again carry off the largest number of prizes next year [and we see no reason why they won't—Editor], this handsome cup will become the permanent property of the Okanogan project for having won it for three consecutive years.

The fruit from the Okanogan project came in competition with fruit from many other places, and the local growers and business men have a right to be justly proud of the showing made. A great deal of favorable advertising will no doubt result from this and probably a great many people will be looking up the Okanogan project if they have in mind the growing of fruit as an occupation.

About 32,000 trout fry have been planted in the vicinity of Sun River Diversion Dam, Sun River project, Montana. Fishing in the vicinity of the dam has been exceptionally good. The record catch this year was a 5½-pound fish, and a number weighing 3 to 4 pounds have been caught.

PROJECT WOMEN AND THEIR INTERESTS

By Mrs. Louella Littlepage.

Sunday Evening.

IN these strenuous days of club, and lodge, and committee meetings, of crowded school curriculum, and movies, the family circle is rarely complete unless it is on Sunday night. Even then the unrest caused by the never-ceasing round of activities moves the members to some action. It is a wise mother who can successfully compete with outside attractions.

A group of busy women recently discussed this problem, and a university professor's wife outlined a plan which worked wonderfully well with her family last winter. Brought up with the old-time reverence for Sunday, she nevertheless saw no reason why she could not make it delightfully pleasant.

The Sunday night supper marked the opening of each charming evening. It was always something simple, but the manner of serving was different. If it were only mush and milk and served on the floor around the fireplace it was a novelty. This part of the entertainment offers a wide field for originality.

For after supper she selected four Biblical and four historical characters, and one at a time she familiarized herself and the children with their lives during the winter. There were Abraham, Isaac, Jacob, and Joseph; Savanarola, Martin Luther, The Black Prince, and King Alfred. These characters became very real after delightful pageantry based on their lives was acted and reacted, all with the aid of a few sheets, the family dog, a quilt of many colors, and fellow professors, their wives, and children, who dropped in regularly and kindly consented to act as camels or kings.

Old foundation hymns were revived, old carols, and post-card pictures of Europe and the Holy Land were projected by the aid of a post-card machine.

The scheme presents unlimited opportunities, not only for keeping the family happily at home, but for teaching history and literature. Children are born actors, and what boy would not be a little more kingly, a little more honorable, after studiously depicting some fine character in this way. Unfortunately history presents many of the other kind who can not be ignored in a child's education, but use judgment in allowing a child to assume these rôles.

Dancing for Trees.

The Orland project people, bent upon making their project one of the most beautiful as well as one of the best of the Government projects, more than a year

ago planned a system of tree-bordered highways connecting the various towns of the valley.

And now the Artois Chamber of Congress will fill in the link between Willows and Orland. It takes money to transport the trees, to buy the necessary wire netting to protect them from rabbits and stray stock, and—well it all costs money. So "The Heart of Glenn County," as the handsome Artois Chamber of Commerce literature announces it to be, recently gave a big dance to defray the cost of the trees, and everybody in Glenn County was invited to go to that village and have a good time, eat the good things provided, dance the dances offered, listen to the good music, and while having the time of their lives, dance a double row of trees into the ground on each side of the highway.

You'll Want this Chart.

To most housekeepers the constant planning of meals is not only monotonous but actually burdensome at times. And this is especially true just now when the urge for balanced rations has practically become a measure of intelligence.

Almost since agriculture became a fixed industry the farmer has given more or less attention to the rations of his live stock, whereas the aim of even the most intelligent of housekeepers was formerly simply to prepare meals which were appealing and filling.

It was only a few years ago when scientists began hurling propaganda concerning the distribution of carbohydrates and proteins and fats at the bewildered housekeepers. Just as they were getting an insight into the balanced rations plan, along came more scientists with vitamins, and dire prophecies of the results in case said vitamins were not properly ladled out to a hungry world.

The worst of it is, or perhaps the best of it, they are right, but this time their advice is constructive, and not only do they tell you what to do but how to do it in a manner that will cut down your doctor bills, build up the general health of the family, and almost entirely eliminate the tiresome planning of former times.

They have worked out a chart on which the six important groups of food are listed, on the theory that some article from each class be furnished at each meal, and the more common foods which are served are given under these groups. This makes it easy. One has only to place a check mark in the columns opposite a given food to indicate its use on a certain day.

If you have not seen these charts write to your demonstration agent, or the State agricultural college.

Make Way for the Goat!

Under this caption a southwestern project paper urges farmers to raise goats, claiming that they are not only thorough grazers when it comes to cleaning up cotton fields, but that the animals eat the pink boll worm, thus making them friends of the quarantine officers. Also the goat is sure death to Johnson grass.

But the goat possesses other virtues which recommend him to mankind to a greater extent than wandering around the garden eating worms. Goat milk is more nearly ideal for infants than anything except their natural food. The cost of keeping a goat is from a dollar to a dollar and a half a month. They require small quarters, are exceedingly clean, gentle, and affectionate. The period of lactation compares with that of the cow.

Child-welfare workers and nurses recommend goat milk as a godsend for infants and invalids. The physical synthesis of goat's milk makes it much superior to that of a cow for food, according to well-known authorities. The globules of butter fat are tiny compared with those of cow's milk. The curds of goat milk are small, light and friable, whereas those of cow's milk are dense, tough, and of cheesy character.

Free bulletins on goats can be secured for the asking from the Bureau of Animal Industry, Department of Agriculture, Washington, D. C.

Banks Loan Money to Boys and Girls.

Banks of Yakima County, Wash., loaned to the boys and girls, club members, \$8,670, or more than any other county in the State, for the development of live-stock work through clubs. Forty-three of the 339 dairy club boys and girls enrolled come from Yakima County. These State dairy club members own stock valued at \$33,321.55 and made a profit from their stock, though much of it is young stock, of \$6,714.52 last year.

Yakima County has 29 pig club members, 24 poultry club members, and 43 dairy club members. The boys and girls numbering 356 enrolled, with 194 reporting, transacted business of \$17,747, and made a profit of \$3,578.

In the dairy club work conducted in the county, all the members are using purebred stock, the local breeders cooperating with them to the fullest extent.

Health Campaigns.

The project papers show unusual activity in health campaigns among the children, the most promising feature of which is the cooperation between parents, teachers, and school nurses. On one project a sanitary engineer states that lack of proper parental

supervision of their eating causes as many school children to be undernourished as does poverty. To counteract both these causes for anemia and underweight an endeavor is being made to induce some civic organization to provide funds for a free milk supply for the children suffering from these ailments.

Thirty per cent of the pupils of local schools in that section are undernourished, and this condition is not caused by underfeeding, but by improper feeding, for as many of those who are underweight come from well-to-do homes as from the homes of the poor. Left alone a child naturally eats what he wants, not what is good for him, preferring candy and cakes to substantial food. In this locality a campaign will be conducted to educate the parents. This will be in addition to giving milk in the classrooms. Often spoiled boys and girls who refuse to drink milk at home will do so in school because other children do and because they desire to please the teacher.

A delightful and striking contrast to this condition is on the Newlands project, where the head nurse of the State Health Association who examined about 500 pupils stated that she had never seen a healthier lot of children than those she examined at Fallon. She found less than 5 per cent of the children here underweight.

In this connection the hot school lunch is now being served almost everywhere. In one of the centralized schools on the Flathead project, where many children come long distances in school busses, the Civic League and school board got together to plan ways and means, with the result that a committee composed of one woman from each school route was appointed which hastily put the project through. Now a hundred children are provided with one hot dish each noon to supplement the lunch they bring from home. A kitchen and dining room have been equipped in the basement of the school, and one woman takes charge of the cooking and serving each month. The expense is borne by the Women's Civic League and the school board; donations of milk and vegetables, etc., are made by patrons of the school.

"The School Lunch" is the title of Bulletin No. 89 just issued by the Extension Service of the State College of Washington. It contains a résumé of a study of the value of the hot lunch, particularly in rural schools, a record card for foods served at various home meals, lunch menu for four school weeks, suggestions for packing lunches at home, and for the organization of a hot lunch club in the school. How to keep accounts in such a club, a score of recipes, and even a chart of table etiquette to be taught the children are included. The boys can make a fireless cooker to save time, fuel, and work. One of the best features of the work is the correcting in a measure some of the faulty dietary habits which are partly

responsible for the low health standard among school children.

A Belle Fourche Project Prize Winner.

The September issue of the RECLAMATION RECORD carried an account of a garden on the Belle Fourche project, South Dakota, which grew magic dollars for Byron K. Guzzie. A few days ago a letter from Mrs. Thurlow, of Vale, brought us further news of our successful gardener which confirmed our suspicion that Byron possessed qualities a little out of the ordinary. He was away from home last year attending high school in Lead. At graduation time he won first prize in oratory, and also a Black Hills district prize; was awarded the honor of having his name engraved on the 1922 Trophy Cup of the Lead High School for excellence in scholarship, and won first prize for the best essay on a given subject. He also won a second State prize for water color work at the State Fair, and one scholarship. Part of his school expenses were paid from the proceeds of that garden experiment.

Lifts a Ton of Water a Day.

The president of one of the Western State normal schools estimates that the numerous processes through which the ordinary household water passes, in the farmhouse which is not equipped with running water, make a grand total for the day of a ton. Take the various steps in washing dishes: The water is first pumped or dipped from well or cistern, carried into the house, then poured into a kettle to heat, poured from the kettle to the dish pan or rinsing pan, from these pans out of doors. The water for preparing vegetables is also handled a surprising number of times, and this cooking and dish-washing takes place regularly three times a day. Then there is the water for bathing, for scrubbing, and for the weekly wash. After carefully estimating the various weights handled he exclaimed "Lifting a ton of water a day, which is only one part of the housewife's work, will take the elasticity out of any woman's step, the bloom out of her cheeks, and the enjoyment out of her soul. Yet we often hear the remark 'After she married she sort of let down, didn't keep up with the times or with her husband.'"

Saves Dollars for Farmers.

Ice on the farm is not a luxury, but an economic necessity, according to the dairy husbandry department of the South Dakota State College. In one summer alone in South Dakota they claim that had the butter and cream been kept cool and marketed in fresh condition, farmers would have realized an increased revenue of \$400,000.

Except in the extreme Southwest, project farm homes can have their own ice by devoting a little

time planning an ice pond. An ordinary pond of 53 square feet provided a ton of ice 8 inches thick.

Orland Boys and Girls Make Good.

A recent Orland paper states that there were organized in 1922 in Glenn County 15 agricultural clubs among the boys and girls, with a total enrollment of 164 members. One hundred and fifty-one of these members turned in club reports. From these an interesting financial statement was obtained which showed that the total value of all club products in 1922 was \$17,621.91; the total cost of production amounted to \$11,210.89, leaving a net profit of \$6,411.02. Another interesting factor relative to this work in Glenn County is that, as a result of an exhibit of 63 of the animals, 55 of the club members were awarded 51 prizes on 41 of the animals exhibited, which makes a total of \$258.50 in prizes.

Americanization.

The most practical work in Americanization which we have had brought to our attention is being done in Phoenix, Salt River project, Arizona. At "Friendly House," the little American bungalow where this work is carried on, the women in charge have approached the problem from a different angle. The evening classes have been solving the educational difficulties, aiding young and old alike to learn the language and some of the customs of the country they have adopted as their own, but the home customs of the average foreigner are so different from those of an American that this has proved one of the greatest stumbling-blocks in the progress of the work.

In Phoenix a member of the State Home Economics Department has started a class in housewifery, to which the mothers and daughters of the Mexican families may come and learn all the up-to-date methods of American housekeeping. The women are taught not only how to run their own homes in an economic and businesslike manner, but to make their learning yield them a good living in case they care to go into other homes as domestics.

The women are also taught how to make their own clothes, as well as fancy work, rugs, artificial flowers, and all the dainty things dear to the heart of the average woman. In order to tempt them and arouse a real pride in the work, every third article made is given to the maker for her own use.

By these methods the foundation of Americanism will be laid in the homes, raising the standard of living there where it will do the most good to the rising generation, which means the voter of tomorrow. A happy and contented citizen is usually a good citizen, and that is what the women of Phoenix are trying to instill into the Mexicans who come under their care in "Friendly House."

SOME PROBLEMS OF THE SETTLER ON IRRIGATED LAND.

By F. B. Linfield, Director, Montana Experiment Station, Bozeman, Mont.

IN PLANNING the development of our irrigation enterprises we seem to have, in a large measure, overlooked the settler. Experience has demonstrated that the settler is the keystone to the arch upon which the success of this irrigation enterprise rests. Upon him must be placed the whole burden of costs and upon him we must depend for the return of all these costs, if the irrigation project is to be successful. I desire to analyze some of the responsibilities that come to this settler, to inquire what may be done to lighten them, and how he may be helped toward a successful issue in his undertaking.

The financial obligations which the settler on the irrigated land must meet may be listed as follows:

1. The cost of the land.
2. The cost of the irrigation works to bring water to the farm.
3. The labor of leveling the land and providing the laterals necessary to get the water to every part of the farm.
4. Making his farm habitable; building a house, barn, and outbuildings, fences, etc.
5. Providing the power, machinery, and equipment needed to do the farm work.
6. The yearly cost of leveling the land, running the laterals, spreading the water over the land, and filling in the ditches before harvesting.

NOTE.—It should be noted that under private enterprises and on Carey Land Act projects the first two items are usually consolidated.

The cost of the land and the cost of the irrigation works will vary considerably for different irrigation projects. Apart from the water much of the land under the ditches has little agricultural value, yet there is a tendency to hold the land at too high a price. With the present level of construction costs very careful study should be made of what these costs involve, and also the possibility of any settler paying out under the type of agriculture that may be practiced in the district. Another item of cost is that of getting the land ready for irrigation, leveling the land, constructing the farm laterals, etc. Studies made by Professor Fortier¹ show that these costs have ranged from \$9 to \$19 per acre, varying with the different projects. The Montana average is given as \$12.50 per acre. This is a record compiled over 12 years ago; the cost is undoubtedly greater now. Professor Fortier estimated that to prepare the land for irrigation in the irriga-

tion enterprises finished or in progress in 1910 would cost more than it had to construct the irrigation works.

Although the total acre cost of this preparation for irrigation will be greater now, yet the proportionate cost probably will be less. It is, nevertheless, a factor that must be considered in settling these irrigated lands.

Another capital cost is providing a house for the farmer and his family, barns for his live stock, and fencing for the protection of his crop. The farmer's house would not be considered a productive enterprise, as he would have to provide this wherever he lived, but the other equipment is a part of the productive equipment of the farm and must pay a return on investment and provide a maintenance charge. I believe much may be done in aiding the settler by showing what may be done in providing neat, simple, and yet adequate structures for his work without serious depletion of his capital.

The farm power, the machinery and the equipment needed to do the farm work also comprise a necessary part of the farm enterprise and of the cost of starting it. The choice of the right size, kind, and quality of these things is of very great importance both from the standpoint of service and of economy. The acre cost of such equipment will range from \$5 to \$10 depending on the size of the farm. The yearly interest and depreciation cost will vary from 50 cents to \$1 per acre.

Another factor to consider on starting an irrigated farm is that more capital is needed for its operation than for a nonirrigated farm, apart altogether from the larger investment. As a rule the fields are smaller, thus requiring more time for the ordinary cultivation of the land. Again, the land must be leveled, ditches must be run, the water must be spread over the land, and in some cases ditches must be filled in after irrigating before the crop is harvested. This cost will range from \$3 to \$6 per acre. Under some conditions where the land is fairly level, with a larger initial expense in preparing the land, the yearly expenses may be reduced, because systems of irrigation may be used that enable the irrigator to control and use effectively a larger volume of water. Then, again, the larger crop produced from a given area of land calls for greater expense in handling the acre crop. Broadly speaking, probably double the work per acre is needed on the irrigated farm as on the nonirrigated farm. Many beginners have failed on the irrigated farm because they have failed to

¹ See Use of Water in Irrigation, by S. Fortier.

recognize this fact; they have tried to spread themselves over the same area of irrigated land as of dry land with the same working capital, and as a result have reaped a very poor crop because the farm work has been poorly done.

Irrigation farming means high acre cost of production. It makes possible high acre yields, but these do not naturally follow. High yields under irrigation are dependent upon skillful and thorough farming and a well worked out crop rotation system. This system must also be applied to the whole area of land owned by the farmer. The cost of construction of the irrigation works and their maintenance is a charge against every acre of land to be irrigated and to the extent that any acre fails to produce, its cost is added to the producing acres and increases their carrying load. If half of the farm under the ditch is not producing, then the construction and maintenance costs for the remainder of the farm are practically doubled and may prove an impossible burden. The settler must be led to recognize this and plan his farm purchases and his farm operations accordingly.

In addition to the above we must recognize that the farmer must live and maintain his family on a scale approximating that of the community in which he resides. To provide adequately for himself and family is after all the sole purpose of the man's endeavors and all these investments must contribute to that end and make it possible, or they fail of their real purpose.

It is evident from the above that a settler on an irrigated farm needs considerable capital to start with or else be able to get the funds needed to equip his farm and make it a habitable and a producing unit at a low annual cost. We must bring to this man all the advantages that accrue to a large and stable business enterprise in the matter of money rates or only the exceptional man can succeed, and there are too few of them to settle these irrigated tracts.

Another important element towards success is experience on an irrigated farm with knowledge how to proceed to prepare the land for irrigation and how to spread the water over the land. The next best thing is a successful farmer, industrious and not afraid of work, who is willing to master the special irrigation problems. He knows the farm game; he needs but to supplement this with knowledge of water control and use. I would not, however, exclude any man who has a liking for the country and farm life, who is able and willing to work; a man who knows his limitations and is anxious to use every avenue of information in working out his farm problem.

Settling these new lands is a young man's job; to develop an irrigated farm and a new community is a life time job. It is, however, a job worthy of any young man's ambition. It is evident that the pro-

spective settler must be very carefully selected and that many persons who offer can not be accepted.

Next the financial problems this man has to face must be carefully studied and the system of payments made such that it is possible for him to meet the obligations as they arise under the particular type of agriculture possible and practicable in the district concerned. What is possible under present and immediate agricultural conditions and market? What are the possibilities of developing markets for more profitable crops and what can be done toward bringing about such new developments? Community effort and planning are necessary, not alone among the farmers themselves but among them and the people of the towns, of the State, and even of the Nation. Permanent success on some of these projects may depend on finding an outlet for the highest valued agricultural product that the district is capable of.

Another important factor in aiding the success of the farmer in the new irrigated district is that he should be fully informed of the size of the job he has undertaken. We must be frank with him and tell the whole story. The construction cost of the irrigation works is only part of the expense. There are other expenses to be met and the settler must reserve sufficient of his capital or of the funds made available to him to maintain his family till his farm is producing and to provide the equipment needed for the operation of the farm. Many settlers fail to comprehend and plan for all the factors necessary to getting their farms into full and successful operation. There must equally be made plain to him that a way had been worked out by which he could successfully carry all these obligations, get the use of capital at a minimum cost, and finally own a farm with all his efforts, provided he did his part in hard and intelligent work.

Finally this man must have ready at his call the information, advice, and help that will enable him to get his farm into the highest state of production at the earliest possible date. A trained and experienced man, thoroughly familiar with irrigation practice, should be available on call to inform and demonstrate how each farmer may use his water and handle his soil so as to get the maximum crop possible. It will vary with the size of the farm but probably one adviser for each 200 to 300 farms would be needed.

The colonizing plans which have worked out most successfully have all provided such an adviser who can study each man's problem and will actually demonstrate how certain methods of preparing and irrigating the land may be carried out. The right man may also act as the schoolmaster in seeing that the plans as agreed upon are carried out, or as a fiscal agent in advising against unwise investments by the settler in agriculture and other equipment.

Let me summarize—the settler is the most important element for the success of the irrigation enter-

prise. Developing an irrigated farm is no simple task and not every person is going to make a success of it. Thus the settler should be carefully selected. He should fully understand the problem involved and his resources should be conserved and used in such a way as to make his work on the farm most effective.

The financial problem he has to meet should be very carefully studied and adapted to the ability of the man and of his farm and of the markets available, both present and prospective, and then the helpful and guiding hand of an adviser should be always at call to inform, to inspire, and to advise.

SUGAR BEETS IN THE YAKIMA VALLEY

By J. L. Lytel, Project Manager, Yakima Project, Washington.

THE Utah-Idaho Sugar Co. has three rather large factories in the Yakima Valley, located at Yakima, Toppenish, and Sunnyside. These were built several years ago, but to date the company has not been able to secure a sufficient acreage of sugar beets to keep the three factories in operation every season. This has been due mainly to unusually high prices secured for other crops, and lack of experience of the average farmer in the production of sugar beets.

The factories are now in charge of experienced sugar-beet men who are giving careful study to all the factors that enter into the successful production of sugar beets with the idea of teaching the farmers of the valley the proper method of cultivating this valuable crop and thus developing the sugar-beet industry to the extent that it will become as important to the State of Washington as it has to other States in the West.

During the past year 28,413 tons of sugar beets were produced in the Yakima Valley from 2,705 acres, and the growers received \$170,478 for the crop. The growers were paid \$8 per ton, with the understanding that they would receive a bonus in case the company sold the sugar for more than 6 cents per pound, the bonus to be paid by February 15, 1923. Present indications are that the growers are almost certain to receive a bonus of at least \$1 per ton shortly after February 1.

After making a study of the cultivation and production of sugar beets in the Yakima Valley, Mr. M. H. Massie, of the Yakima County Farm Bureau, gives the following as his opinion of the future of the industry here:

Investigation shows very conclusively that more cultivated or row crops are needed in our rotation system, and that where sugar beets have been grown the land is usually left in a very fine condition for other crops; as to the returns to the farmers we believe that this year the men who have been growing sugar beets are practically the only ones who have ready cash to meet their obligations.

One of the most favorable things in connection with sugar beet growing is the assurance of a ready cash market and although the price per ton has not been large, yet where proper methods have been pursued, the sugar beet acreage has shown a profit.

Many farmers have claimed in the past that sugar beets could not be grown here profitably because of blight or unfavorable weather conditions during June and July, but our investigation has not been extensive enough to determine whether this is true. The limited observation seems to indicate that sugar beets are no more likely to be a failure in this valley than any other crops and probably not subject to any more diseases or pests; and one of the big troubles seems to be at this time that the Utah-Idaho Sugar Co. started business here on the basis of developing a large industry at once when there were no farmers in this valley that were acquainted with the methods of beet culture and consequently many failures resulted.

The sugar company now realizes that a mistake has been made and is starting in to develop a large number of efficient beet growers who will start in a small way and learn beet culture just as thoroughly as they have learned the growing of other crops; and eventually there is no doubt that beets will take their place in the general scheme of agriculture in this valley.

The following is a list of representative farmers in different parts of the valley who secured very satisfactory results from the cultivation of sugar beets during the 1922 season.

Sugar-beet crop returns for 1922.

Name and address of grower.	Acre.	Total yield.	Average yield.
Yakima:		<i>Tons.</i>	<i>Tons.</i>
T. Wheeler.....	21	331.58	15.79
Yakima factory (Utah-Idaho Co.)....	13	247.142	19.01
Wapato:			
Zier Bros.....	18	331.087	18.39
R. B. Brown.....	47	739.047	15.72
Tieton:			
Thos. Curtis.....	15	255.854	17.05
Walla Walla:			
L. H. Smith.....	12	210.311	17.52
Sunnyside:			
L. W. Chamberlain.....	47.5	905.995	19.07
Lee Wardell.....	79	591.1155	20.37
Toppenish:			
Sterling Lewis.....	45	860.129	19.33
A. B. Bartlett.....	16	293.379	18.33
F. A. Ivall.....	14	243.155	16.72
Fred Foos.....	33	519.54	15.74
Junius Ferrin.....	10	187.689	18.76
L. L. Beckstead.....	78	1,131.217	14.61

The management of the Utah-Idaho Sugar Co. is using great care in selecting the ground for planting sugar beets, as they are anxious that every farmer

going into the business shall have a reasonable degree of success; it is believed that in following this policy the sugar beet industry as well as the farmers who produce the crop will prosper, and that a sufficient acreage will be cultivated to this crop in a few years to enable the company to operate the three factories to full capacity during the sugar campaign.

The crop is handled in such a way that there is no question as to the market; transportation facilities can not seriously interfere with either the harvest-

ing or moving of the crop, and the farmer is certain to receive his returns within a month from the time he delivers the beets at the beet dump along the railroad or at the factory. This is an appreciable benefit to the grower, as he needs and is entitled to prompt returns from the product of his farm plant.

That the sugar company has great faith in this industry in the Yakima Valley is evidenced by its rather large investment in the three factories above mentioned.

VACANT PUBLIC LANDS AND THEIR RELATION TO THE WORK OF THE RECLAMATION SERVICE.

By F. H. Newell, Consulting Engineer, U. S. R. S.

THE work of the Reclamation Service has been made possible by the act of June 17, 1902, which provides that moneys received from the sale and disposal of public lands in 16 western States, beginning with July 1, 1901, should be appropriated as a special fund to be used in the examination, survey, construction, and maintenance of irrigation works for the storage, diversion and development of waters for the reclamation of arid and semiarid lands, and for the payment of all other expenditures provided for in the act.

Under this provision there has been accumulated in the reclamation fund over \$100,000,000. The accruals by years are given in Table 1. An examination of this shows that these annual increments to the fund have decreased from the maximum in 1908 of nearly \$9,500,000 to less than \$2,000,000. Such diminution may be expected to continue, as the remaining public lands decrease in area. It is, therefore, a matter of large interest to the public—particularly of the Western States—to have an account of stock taken of the remaining public lands and to obtain some conception of their area and location, their present or prospective value, and other facts which bear upon the probability not only of the reclamation and use of these lands, but of the revenue which may be derived from them.

The history of the United States public-land laws, prepared by Philip P. Wells, is in manuscript form, unpublished, in the Library of Congress, as described in the report of the Librarian of Congress for the fiscal year ending June 30, 1916, pages 145-151.

Table 2 gives for each of these 16 western States the total land area in acres; also the amount set aside as various reservations, and the percentage these bear to the area of the State; also the acreage reserved permanently as national parks and the percentage of these. Next is given the area now held in the reservations for the use of the native Indians.

This is also regarded as somewhat temporary, as it is probable that Congress, from time to time, will allot these lands in severalty, and throw open the remaining lands. Some of these may be irrigable. There is also given the estimated acreage of unappropriated and unreserved lands in these States, this being the lands from which additions to the reclamation funds may be expected.

TABLE 1.—Funds accruing from public lands.

Year.	Sale of public land and town sites.
1901	\$3,144,822
1902	4,585,521
1903	8,713,997
1904	6,826,254
1905	4,805,515
1906	5,166,336
1907	7,975,667
1908	9,443,438
1909	7,765,485
1910	7,088,299
1911	6,205,017
1912	5,672,723
1913	5,755,695
1914	3,475,732
1915	3,286,494
1916	2,669,247
1917	2,896,636
1918	2,613,641
1919	2,014,859
1920	2,688,148
1921	2,806,403
1922	1,547,385
	105,147,314

The total of the areas in forest reservations, in national parks, and in Indian reservations, added to that reported as "unappropriated and unreserved," when deducted from the total land area of the State, gives a remainder which may be considered as representing the lands in private and corporate ownership, subject to local development and taxation.

In looking at the table as a whole, or at Figure 1, it is seen that the largest bodies of public lands—

TABLE 2.—Area of arid and semiarid States, showing acreage and percentage in national forests, in national parks, and in Indian reservations; also extent of vacant public land, 1922.

State.	Area of land.	Forest reservations.	Per cent.	Parks, etc.	Per cent.	Indian reservations.	Per cent.	Unappropriated and unreserved.	Per cent.	Balance private land.	Per cent.
	<i>Acres.</i>	<i>Acres.</i>		<i>Acres.</i>		<i>Acres.</i>		<i>Acres.</i>		<i>Acres.</i>	
Arizona.....	72,838,400	11,267,640	15.47	640,747	0.88	18,653,014	25.6	16,209,426	22.25	26,067,573	35.80
California.....	99,617,280	19,181,508	19.25	950,828	.94	517,118	.52	18,883,542	18.95	60,084,284	60.34
Colorado.....	66,341,120	13,291,280	20.03	295,500	.44	468,874	.72	8,150,263	12.28	44,135,203	66.53
Idaho.....	53,346,560	18,752,625	35.15	23,040	.04	682,939	1.28	8,606,301	16.13	25,281,655	47.40
Kansas.....	52,335,360					272,519	.52	3,213	.006	52,059,628	99.474
Montana.....	93,568,640	15,933,889	17.03	1,092,053	1.16	6,053,673	6.48	5,720,125	6.11	64,768,900	69.22
Nebraska.....	49,157,120	205,944	.456	2,054	.004	359,542	.74	19,232	.03	48,570,348	98.77
Nevada.....	70,285,440	4,976,137	7.08			740,635	1.05	52,742,711	75.04	11,825,957	16.83
New Mexico.....	78,401,920	8,423,338	10.74	22,110	.03	4,697,224	5.99	18,064,006	23.04	47,195,242	60.20
North Dakota.....	44,917,120			1,033	.002	2,105,320	4.79	91,297	.02	42,719,470	95.188
Oklahoma.....	44,424,960	61,480	.14	848	.002	19,551,890	44.018	19,228	.04	24,791,514	55.80
Oregon.....	61,188,480	13,132,659	21.46	156,920	.25	1,718,006	2.80	13,784,451	22.53	32,396,444	52.96
South Dakota.....	49,195,520	1,058,745	2.15	10,899	.02	6,685,734	13.60	212,942	.43	41,227,200	83.80
Utah.....	52,597,760	7,451,548	14.17	70,362	.13	1,041,307	1.98	27,038,183	51.41	16,996,360	32.31
Washington.....	42,775,040	9,934,275	23.22	207,342	1.18	2,766,479	6.47	1,038,410	2.43	28,529,164	66.70
Wyoming.....	62,460,160	8,414,452	13.47	1,994,322	3.19	2,102,286	3.36	18,365,875	29.44	31,583,225	50.54
Total.....	993,450,880	132,085,520	13.3	5,767,428	.6	68,416,560	6.9	188,949,205	19.0	598,232,167	60.2

¹ Olympic National Monument.

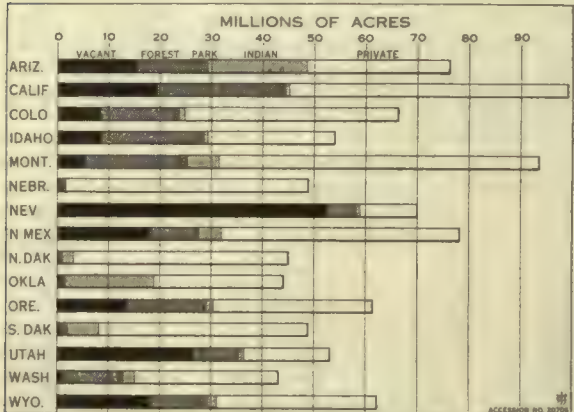


FIG. 1.—Relative area of each of the Western States, classified by type of land.

TABLE 3.—Total acreage of public lands entered 1901 to 1922, in the reclamation States.

State.	Acres.
Arizona.....	14,960,469.99
California.....	18,017,016.06
Colorado.....	37,806,002.38
Idaho.....	20,095,932.80
Kansas.....	4,445,309.37
Montana.....	58,806,102.82
Nebraska.....	22,603,759.91
Nevada.....	3,599,938.38
New Mexico.....	38,451,758.40
North Dakota.....	22,735,079.59
Oklahoma.....	15,062,534.77
Oregon.....	18,360,434.89
South Dakota.....	19,826,348.02
Utah.....	7,865,515.17
Washington.....	12,064,647.04
Wyoming.....	29,333,522.62
Grand total.....	344,034,372.21

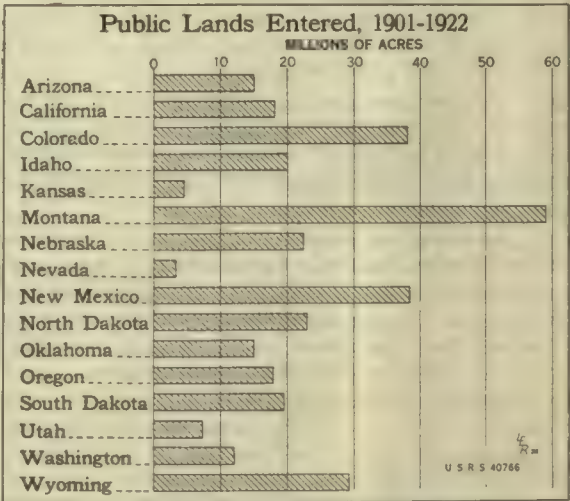


FIG. 2.—Total acreage of public land entered, 1901-1922, in the Western States.

that is, those unappropriated and unreserved, are, in the order of magnitude, in the States of Nevada, Utah, California, Wyoming, New Mexico, Arizona, etc.—being mainly within what is known as the "Great Interior Basin." Most of these lands have little economic value, excepting for occasional grazing. They are located on the great barren mountain masses, or in the deserts with a vegetation in places too scanty to support the grazing industry. Some portions may contain valuable mineral deposits yet to be discovered; but, as a whole, the disposal of these lands must take place slowly, and only as rapidly as water supply is made available for rela-

tively small portions, or the grazing industry is regulated and developed in other places.

The rate at which these public lands have been disposed of during the past 20 years, during the time of the operation of the reclamation act, is indicated in Table 3, which gives alphabetically, by States, the total acreage of the lands entered during these years, as reported by the General Land Office.

This does not imply that complete disposal was made of the entire acreage; some of the entries were never finally completed by the original entrymen, but the lands were later taken up by some other person, thus there is, to a small extent, a duplication of acreage, but the figures are sufficiently accurate to indicate the activities in the different States.

It is to be noted that Montana leads in acreage entered. This is due to the so-called "dry-farming"

propaganda, and to the contention that the broad areas of the high plains which had been considered as useful only for grazing could be cultivated for the production of wheat and other grains. In years of favorable rainfall the yield was sufficiently large to justify the effort, but such years, as shown by past experience, are rare; and in the long run much of this "dry-farming" land has been abandoned.

Figure 2 shows graphically the relative amount of land entered in the different States, bringing out the fact that from Montana and North Dakota across through the High Plains great areas of land have been entered, lying in Wyoming, Colorado, and New Mexico. The smallest amount entered is in the State of Nevada, where the largest area of public land still remains; of doubtful value, however, on account of lack of moisture.

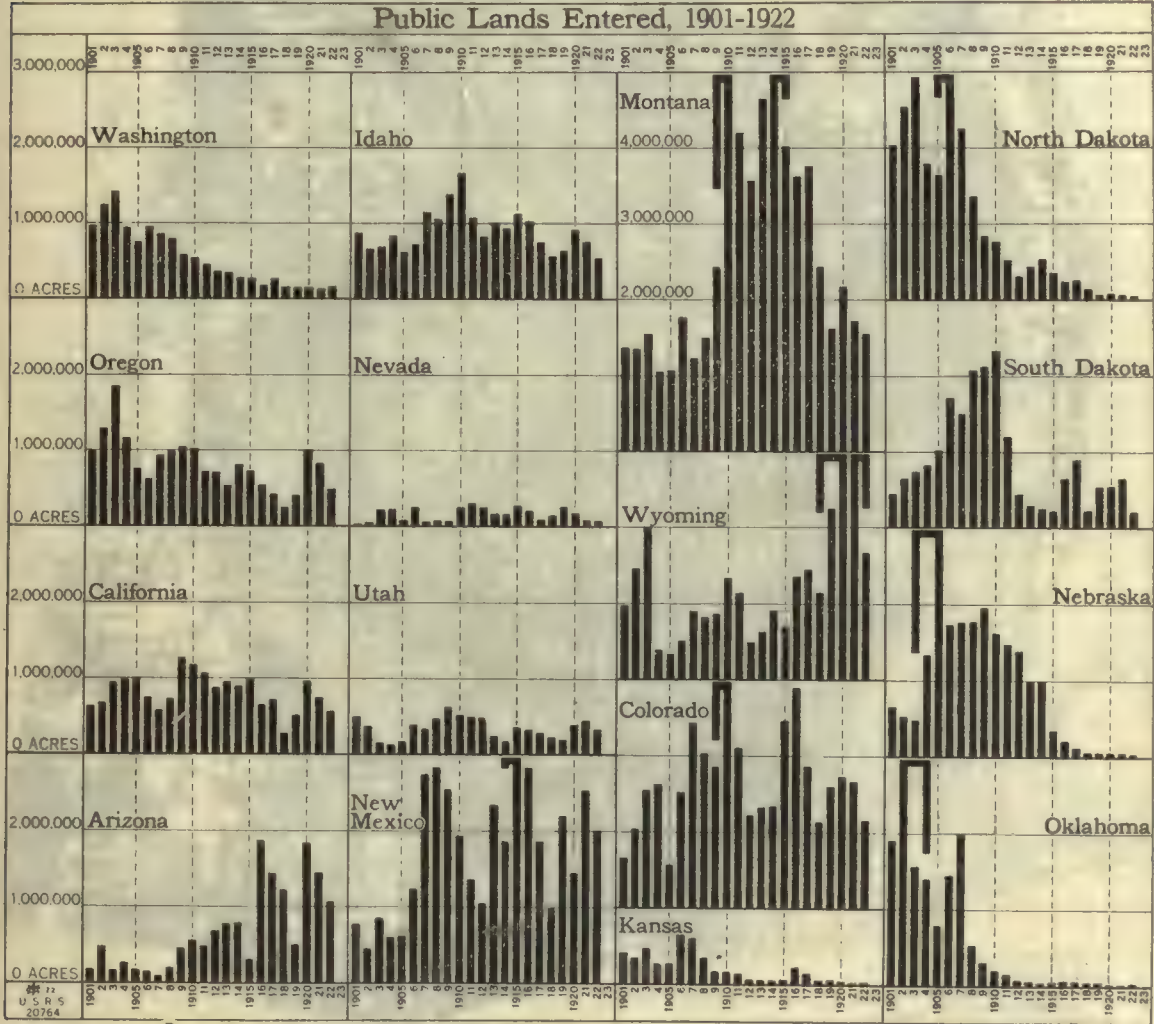


FIG. 3.—Public land entered, 1901-1922, by States.

Figure 3 shows, for the years 1901 to June 30, 1922, the acreage of the entries in each of the reclamation States, the differences which exist, and the effect of the agitation in favor of dry farming or of the enlarged homestead acts. For example, the State in which most public land has been taken is Montana, where the most effective efforts were made to encourage dry farming on the lands which up to that time had been considered as valuable mainly for grazing.

A comparison of the relative area and extent of the vacant public lands before the time of passage of the reclamation act, and after 20 years of reclamation is brought out in Figures 4 and 5; each of these shows in solid black the public lands; a glance at the two illustrates the rapid shrinking in area of the lands, and the fact that the remaining public land is located mainly in the area from Great Salt Lake west and south, in the deserts, mountains, and valleys of Nevada and California.



FIG. 4.—Vacant public land, etc., in the Western States in 1902.

These maps also bring out the development of the national forests, which have been created to embrace the principal timbered mountain ranges.

Considering Figure 5, which gives the location of the remaining vacant lands, it should be noted that the lands which have been open to entry and settlement have been picked over again and again; first by the cattle and sheep men, then by the home seekers

and miners. Wherever water could be had an entry has been made, often in the form of a string of 40-acre tracts extending along some stream, or embracing a "water hole." Practically every acre of land not already reserved, but which ultimately may be irrigated in any conceivable way has been taken up in the hope that either private or public enterprise can be induced to construct a reclamation system to



FIG. 5.—Vacant public land, etc., in the Western States in 1922.

reach these lands. Because of the scattered condition of the remaining public lands any movement to utilize them is embarrassed to a certain extent by the divided ownership and by rights to water which, under State laws, have become vested.

DESCRIPTION BY STATES.

In order to obtain a more detailed view of the condition of the vacant public lands, and the way in which these lands may be handled for the benefit of the reclamation fund, it is desirable to consider the area by States. Tables 4 to 14, inclusive, give for each of the specified States the distribution of the acreage reserved, unreserved, and in private or corporate ownership. The same information is shown graphically in the accompanying State maps, Figures 6 to 16, inclusive.



FIG. 6.—Arizona; location and classification of land.

TABLE 4.—Arizona.

	Acres.	Per cent.
Vacant, or unappropriated and unreserved lands...	16,209,426	22.25
National forests.....	11,267,640	15.47
National parks.....	640,747	.88
Indian reservations.....	18,653,014	25.6
Private and corporate lands.....	26,067,573	35.8
Total.....	72,838,400	100.0

Arizona.—In size Arizona is one of the largest of the States, but of this vast area of 113,110 square

miles, or 72,838,400 acres, only about a third, or 25,000,000 is in private ownership; comparing this land in private ownership, it will be seen that the taxable acreage is about equal to the area of the State of Kentucky, or of Tennessee, Virginia, or Indiana.

California.—Next to Texas, California is the largest State in the Union, having an area of nearly 100,000,000 acres. It contains also the largest area of national forests, these including the principal mountain ranges, notably the High Sierras and the Northern Coast Range. The public lands are for the most part in the southeast or desert portion, east of Owens Valley, being a continuation of those in Nevada. There are relatively few areas of public land remaining in the extreme northeast, and these are rapidly disappearing, as they are being taken up largely for grazing purposes.



FIG. 7.—California; location and classification of land.

TABLE 5.—California.

	Acres.	Per cent.
Vacant or unappropriated and unreserved lands...	18,883,542	18.95
National forests.....	19,181,508	19.25
National parks.....	950,828	.94
Indian reservations.....	517,118	.52
Private and corporate lands.....	60,084,284	60.34
Total.....	99,617,280	100.00

Colorado.—Practically all of the public land formally existing in the eastern half of Colorado has been

taken up, mainly for dry farming; the western part of the State, including the Rocky Mountain region, has been set aside in national forests, the aggregate area being over 13,000,000 acres, or one-fifth of the State.

The remaining public land is valued mainly for grazing, although there are some tracts covered with a scanty forest growth.

TABLE 6.—Colorado.

	Acres.	Per cent.
Vacant or unappropriated and unreserved lands....	8,150,263	12.28
National forests.....	13,291,280	20.03
National parks.....	295,500	.44
Indian reservations.....	468,874	.72
Private and corporate lands.....	44,135,203	66.53
Total.....	66,341,120	100.00

Idaho.—This State contains the largest percentage of national forests, these covering the mountain areas which make up a great portion of the northern part of the State. The public lands now left are scattered through the southern part of the State, the greater portion being toward the Nevada line. These have considerable value for grazing purposes and contain some timber, at present inaccessible.

TABLE 7.—Idaho.

	Acres.	Per cent.
Vacant or unappropriated and unreserved lands....	8,606,301	16.13
National forests.....	18,752,625	35.15
National parks.....	23,040	.04
Indian reservations.....	682,839	1.28
Private and corporate lands.....	25,281,655	47.40
Total.....	53,346,560	100.00

Montana.—In this State—the third in size in the Union—there have been the greatest number and area of land selections made during the past 20 years. The enthusiasm which swept over the country in favor of dry farming resulted in the taking up of practically every acre of land which could be plowed, also considerable areas which could not be tilled nor utilized for cultivation. The result is that there is now left only about 6 per cent of the area of the State in lands unappropriated and unreserved, these lands being scattered in and around the outlying mountain masses of the Little Rockies, Big Snowy, and other isolated ranges, which break the monotony of the High Plains. These public lands contain some scattered timber and are of considerable value to the local stockmen.

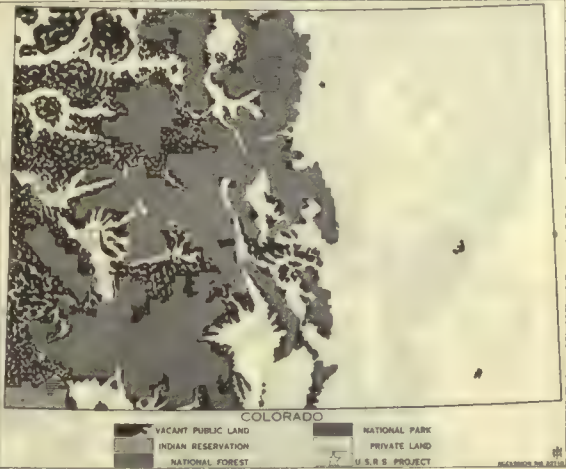


FIG. 8.—Colorado; location and classification of land.



FIG. 9.—Idaho; location and classification of land.

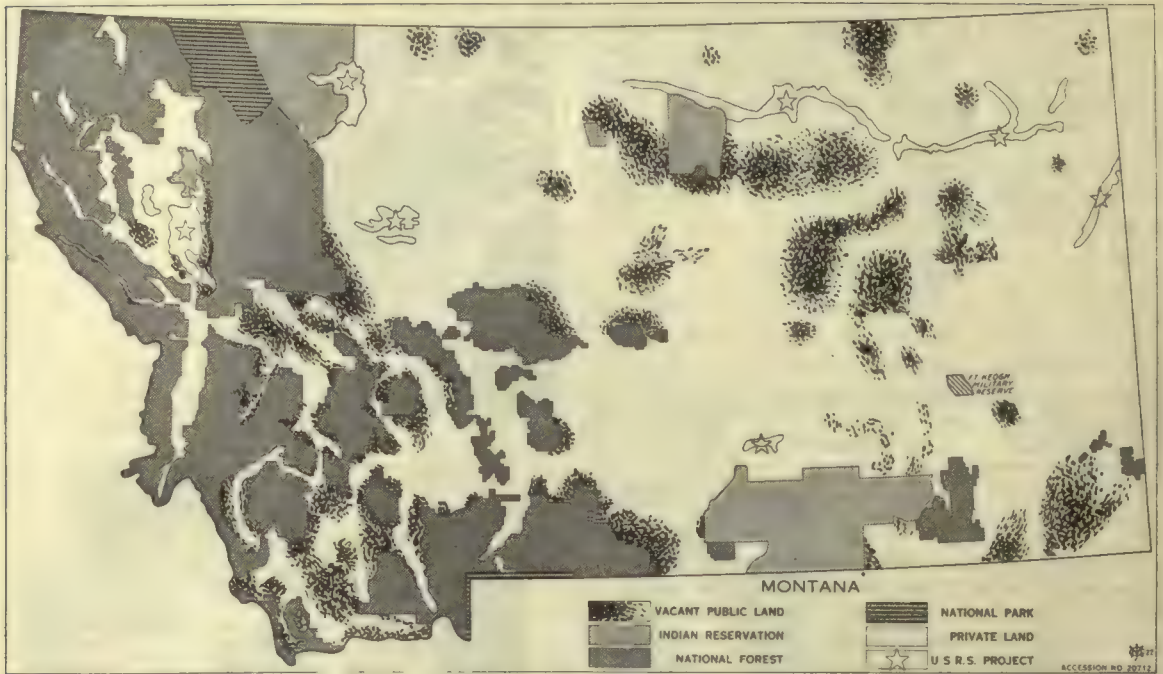


FIG. 10.—Montana; location and classification of land.

TABLE 8.—Montana.

	Acres.	Per cent.
Vacant or unappropriated and unreserved lands....	5,720,125	6.11
National forests.....	15,833,889	17.03
National parks.....	1,092,053	1.16
Indian reservations.....	6,053,673	6.48
Private and corporate lands.....	64,768,900	69.22
Total.....	93,568,640	100.00

Nevada.—This is what may be called the “public land State,” as it has three-fourths of its area still unappropriated and unreserved. It has nearly double the area of such land as Utah, which comes next in rank, with a little over one-half of its land surface still public. The principal mountain ranges have been set aside as national forests but between these are desert valleys, covered with scanty vegetation affording occasional grazing. These areas, however, are not in solid blocks, but whenever a stream issues from the mountains or there is a probability of obtaining water by wells or storage, the lands have passed into private ownership. Such ownership of the water holes practically controls the grazing on vast areas of public lands.

TABLE 9.—Nevada.

	Acres.	Per cent.
Vacant, or unappropriated and unreserved lands...	52,742,711	75.04
National forests.....	4,976,137	7.08
Indian reservations.....	740,635	1.05
Private and corporate lands.....	11,825,957	16.83
Total.....	70,285,440	100.00



FIG. 11.—Nevada; location and classification of land.

New Mexico.—In this State, as in Colorado, the eastern half has passed wholly into private ownership. There are still extensive areas of public lands, embracing about one-fourth of the State, mainly in the western part and adjacent to the national forests. It is quite probable that additional forests or parks may be created on some of these public lands.

TABLE 10.—*New Mexico.*

	Acres.	Per cent.
Vacant, or unappropriated and unreserved lands.....	18,064,006	23.04
National forests.....	5,423,338	10.74
National parks.....	22,110	.03
Indian reservations.....	4,667,224	5.99
Private and corporate lands.....	47,195,242	60.20
Total.....	78,401,920	100.00



FIG. 12.—*New Mexico*; location and classification of land.

TABLE 11.—*Oregon.*

	Acres.	Per cent.
Vacant, or unappropriated and unreserved lands.....	13,784,451	22.53
National forests.....	13,132,659	21.46
National parks.....	156,920	.25
Indian reservations.....	1,718,006	2.80
Private and corporate lands.....	32,396,444	52.96
Total.....	61,188,480	100.00

Oregon.—The Cascade Mountains which divide the State have been included for the most part in national forests. The broad, nearly desert areas to the east of the mountains have passed largely into private ownership and are held as cattle ranges. The greatest proportion of the public land lies in the south-east, adjacent to Nevada.

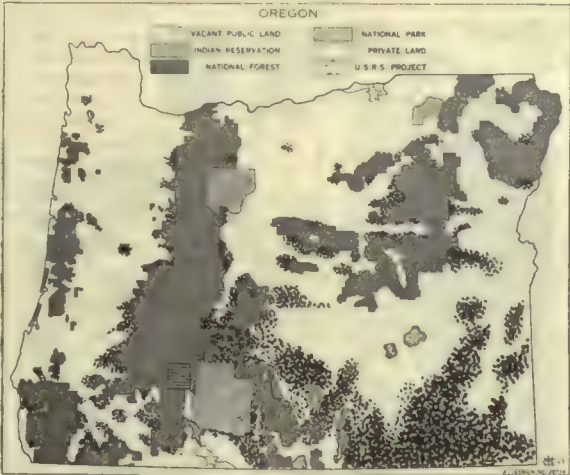


FIG. 13.—*Oregon*; location and classification of land.

Utah.—This State, located near the center of the arid region, is of peculiar interest in connection with the reclamation development, because here the first settlements of notable size, dependent upon irrigation, were made by people coming from the East. In total area, the State may be considered as large, but less than a third of the area is in private or corporate ownership, this having an aggregate extent of 16,996,360 acres. What may be called the "usable" portion of Utah is approximately equal in size to the State of West Virginia, and about equals the total size of New Hampshire, Vermont, and Massachusetts.

The total land surface of Utah is given as 82,184 square miles, or 52,597,760 acres. To this is to be added a water surface of over 2,800 square miles, mostly in Great Salt Lake.

TABLE 12.—*Utah.*

	Acres.	Per cent.
Vacant, or unappropriated and unreserved lands.....	27,038,183	51.41
National forests.....	7,451,548	14.17
National parks.....	70,362	.13
Indian reservations.....	1,041,307	1.98
Private and corporate lands.....	16,996,360	32.31
Total.....	52,597,760	100.00

Present interest centers in the unappropriated and unreserved land, which includes over half the area of the State, and as to the probability of obtaining an adequate water supply for reclaiming any considerable part of this land; and also as to the extent to which this land may be disposed of for the benefit of the reclamation fund.



FIG. 14.—Utah; location and classification of land.

Washington.—As in the case of the State of Oregon, the great mountain range which separates the State into two portions is included within a national forest. The remaining public land, about 2½ per cent of the area of the State, is scattered on both sides of the mountains, the principal portion being on the relatively desert area adjacent to Columbia River. Most of this land is extremely rough, though some of it may have value for grazing.

TABLE 13.—Washington.

	Acres.	Per cent.
Vacant or unappropriated and unreserved lands...	1,038,410	2.43
National forests.....	9,934,275	23.22
National parks.....	506,712	1.18
Indian reservations.....	2,766,479	6.47
Private and corporate lands.....	28,529,164	66.70
Total.....	42,775,040	100.00



FIG. 15.—Washington; location and classification of land.

TABLE 14.—Wyoming.

	Acres.	Per cent.
Vacant or unappropriated and unreserved lands....	18,365,875	29.44
National forests.....	8,414,452	13.47
National parks.....	1,994,322	3.19
Indian reservations.....	2,102,286	3.36
Private and corporate lands.....	31,583,225	50.54
Total.....	62,460,160	100.00

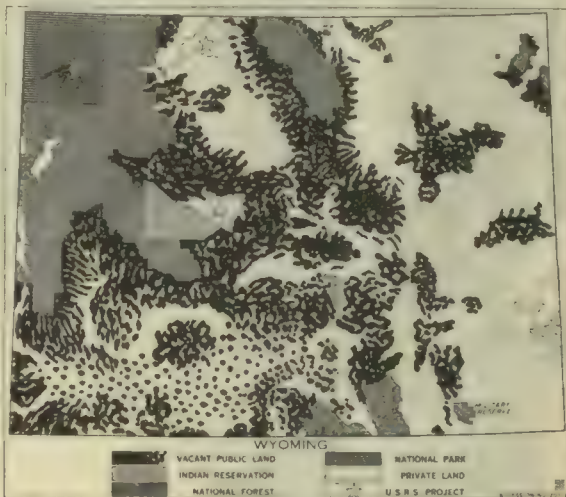


FIG. 16.—Wyoming; location and classification of land.

Wyoming.—As regards the relative proportion of unappropriated and unreserved lands, this State stands third, being exceeded by Nevada and Utah. The greater part of Yellowstone National Park is in this State; thus, with the Indian reservations, about 20 per cent of the land is reserved, 30 per cent va-

cant, and 50 per cent in private or corporate ownership. The public lands are mostly in the mountains or low foothills; or in the vast, almost desert valleys.

The principal problem in connection with these lands is that of utilizing properly the grazing lands and protecting them from abuse.

THE OREGON IRRIGATION CONGRESS AND STATE DEVELOPMENT

By L. A. Hunt, Manager, Oregon Cooperative Hay Growers,
Hermiston, Oregon.

DURING the war, when farmers were selling produce at fabulous prices, farm lands were in great demand. The only concern of irrigationists was construction.

Several publicity campaigns had been put on to tell eastern people of Oregon's opportunities and the State had secured many agricultural settlers. But in summing up the situation in the session of the Oregon Irrigation Congress in 1919, the fact that an exceedingly heavy per cent had returned to the East, broken in money and spirit, was too patent to be ignored. Many settlers were not making good. Bonds could now be sold, projects could be financed, engineering estimates were being found comparatively reliable, and the water was going onto the land; but without the final factor, the settler, irrigation in Oregon could not succeed.

Plans were again made to obtain settlers. A great publicity campaign was launched, subsidized by the State and assisted by private contributions. Special representatives spent the better part of a year in the Middle States, the plan being to secure several trainloads of settlers. Local arrangements were made to care for them upon arrival. The program was carried out upon a magnificent scale. Reams of newspaper copy were printed. The railroads cooperated. The campaign was entirely successful, except in results.

The many trainloads of settlers dwindled and again dwindled, until only six persons actually made the trip and none with any definite intention of settling in Oregon.

This was the report for the year 1921 as received at the meeting of the Oregon Irrigation Congress at Pendleton. The outlook was far from pleasant.

Bonds amounting to many millions of dollars had been sold, the money spent, and the land ready for the settler, but the ever elusive settler was land shy. All over the United States the percentage of men on the farms was decreasing.

These conditions were not due to any fault in the land itself, but were being charged primarily to economic conditions of the after-war period. The situation was becoming critical. The State was back of the interest on the bonds. Taxes were high and the only solution was settlers.

WHAT WAS THE MATTER?

The congress turned to the problem with true Oregon determination.

Through the cooperation of the Portland Chamber of Commerce and the personal efforts of its manager, Mr. Dodson, and Whitney Boise and Fred N. Wallace of the Irrigation Congress, representatives were sent to States where settlement was succeeding, to find the cause. Their investigation was thorough and complete, covering many States. The report was made through the Oregon development board to the congress in Bend in November, 1922. Success is being attained in many parts of the West, but success in land settlement can not be counted success unless the settler is economically successful. The soil is here, its fertility is undoubted, transportation is available, and the consumer is waiting.

The results of their study may be briefly summarized:

1. The settlement of any project should be made with the aim of producing only certain crops as standard for this project, to insure sufficient volume for economic marketing.
2. The settler should be secured with this aim in mind and should have expert assistance in adjusting himself to his new conditions.
3. The payment for the land must be made more lenient than in the past, preferably upon some amortization plan.

4. The development of marketing machinery to carry his commodity to the consumer is fundamental and should be planned in advance of settlement.

The success of cooperative marketing as practiced in California is so pronounced that the development board and the Irrigation Congress are absolutely committed to it. Their representative, Mr. Malboeuf, after months of study covering over sixty cooperative commodity organizations in that State, says:

We deal in big figures when California's production is considered, the yield for 1921, for example, being for field crops 8,200,000 tons, fruit crops 2,250,000 tons, vegetables and cantaloupes reaching upward of 600,000 tons. So are its marketing associations allied with tremendous figures. Between 80 and 85 per cent of the almond tonnage is handled by the almond growers' association, the prune and apricot growers'

association controls upward of 80 per cent of the State's dried prune production of 100,000 tons and 75 per cent of dried apricots representing 12,000 tons.

Fifty per cent of the dairy products, valued at close to \$90,000,000 annually, are marketed cooperatively. Three-fourths of the fig tonnage of 9,000 tons, 78 per cent of the citrus crops—aggregating a State yield of close to 60,000 carloads annually; 90 per cent of the raisin production of 130,000 tons, and 80 per cent of the dried-peach tonnage of 20,000 tons, are likewise marketed direct by the producers through their organizations.

Their success is responsible primarily for the agricultural prosperity of the farmers of California and is due largely to two factors—stabilization of prices and economy of distribution.

The Portland Chamber of Commerce is preparing to finance a new settlement campaign to the tune of \$150,000 per year. Two-thirds of this is to be spent in advertising Oregon scenic playgrounds, which are unsurpassed anywhere in the world; and in seeing these the people will see the State.

There is an old adage that sugar is better than vinegar to catch flies. Experience proves that set-

tlers flock to the districts where the present farmer is already making good. Land values are not the determining factor. The ability to make good with the local banker is the condition demanded by the settler of to-day.

With this in view, and feeling that the present settler must be made prosperous before new settlers are solicited, \$100,000 will be spent during the next two years in getting the Oregon marketing system properly developed. Farmers, bankers, and business men are to be informed of the fundamentals of cooperative marketing. Expert business assistance is to be extended to cooperatives, and as far as possible the business irregularities ironed out. Proper financing is to be secured. It is hoped that within two years the present Oregon farmers can be placed upon the highway of prosperity.

This is a most ambitious and unique program, surpassed by no State save possibly California. When it succeeds, and it has every prospect of success, getting new settlers for Oregon will have ceased to be a problem, and the Oregon Irrigation Congress can write another great chapter in the history of its achievements.

THE RECLAMATION MAIL BAG

How One Irrigation District Works.

AT THE request of District Counsel H. L. Holgate, Mr. A. L. Wishard, secretary of the Klamath Irrigation District, Klamath project, Oregon-California, has sent us a copy of his letter of December 28 to Mr. G. E. Rodman, secretary of the Sunnyside Valley Irrigation District, Yakima project, Washington, which we take pleasure in printing below for the information of others. Space will not permit the printing of the entire statement and financial report to the members of the Klamath Irrigation District, a copy of which accompanied the letter, but we can not refrain from printing two paragraphs, which emphasize a feature that should always be in the minds of the water users, namely, that they should give careful attention to the business of the district, and the vital necessity of having the water users go to the polls, attend the meetings, and express themselves upon the important matters which come before them. In this connection Mr. Wishard says:

"I appreciate that every one of you are kept mighty busy keeping things going at home; therefore, you do not have a great deal of extra time to devote to outside matters; however, the irrigation end of your business seems to me to be quite important and you should give it more thought and consideration.

"The point that I want to bring out is: We have, at various times, been confronted with some very important problems, problems that meant consider-

able to you and the community as a whole, problems that you were fortunate enough to have directors of a type capable of solving and acting upon in an impartial and intelligent manner. Some matters were submitted to you for consideration and ratification; how well did you attend to your duties? Not very well. Out of some 600 members in the district, I think the largest vote ever polled on any issue was 247, and I want to add that if a few interested members had not gone out and done a lot of arguing and urging the showing would be considerably worse. Your present officers are responsible for the change in the district law, whereby our annual elections are held the second Tuesday in October; heretofore the annual election has been held the second Tuesday in January. This change was made, hoping that more of you would take an active interest in your affairs. The success or failure of this part of your business depends upon you and you can't act intelligently unless you have some knowledge of your business."

Mr. Wishard's letter is as follows:

KLAMATH IRRIGATION DISTRICT,
KLAMATH PROJECT, U. S. RECLAMATION SERVICE,
Klamath Falls, Oreg., December 28, 1922.

MR. G. E. RODMAN,
Secretary Sunnyside Valley Irrigation District,
Sunnyside, Wash.

DEAR SIR: We have a copy of Mr. Holgate's letter of the 19th, requesting that I express to you my opinion of the workings of our district as a possible aid to your board in considering proposed changes in procedure.

I assume that in general our districts are organized along the same lines and have, with the exceptions

noted in Mr. Holgate's letter, similar contracts with the United States. Apparently, therefore, my views with respect to those exceptions will be pertinent.

Our district does not act as fiscal agent of the United States. All revenues of the district, for payments to the United States for project charges and for strictly district purposes, are provided by tax collections. Everything of the kind is assessed as taxes. The project office and I cooperate in preparing the tax rolls.

Our district would not willingly adopt the plan you have, for such plan would require the district to maintain a large office force without reducing the office force of the project, which would have to prepare and mail statements and continue the keeping of the individual accounts. That would seem an extra and unnecessary expense.

Also, taking everything into consideration, it is really better for the water users to pay these charges as taxes rather than to incur the bother and inconvenience of having a different date for the payment of the water charges.

I believe a very large majority of our water users would take over the operation and maintenance of any part of the system only because they had to. I know our directors would not willingly undertake any such responsibility, although the Reclamation Service has signified its desire that we do so. The service has intimated that under the district's operation and maintenance of the system certain overhead charges could be avoided, but we figure that such saving would not equal the interest on the money the district would have to advance, to say nothing of the loss and waste through inexperience, influence of local politics, etc.

Perhaps one of the overhead expenses we could eliminate in part by the district taking over the project is the cost of the service legal division. But we would lose much more than we would save, for in the matter of damage claims alone the service lawyers save us a lot of money.

Such claims constantly arise. The deserving ones are settled equitably and others get nowhere, for the claimants do not care to fight the United States and its lawyers. A lot of these claims would prevail if the district were operating the system. Our district did adjust one claim and got gloriously stung.

I have no information as to the result of your district's maintaining a part only of the system, but I do not see how that can be economically done. The double overhead, alone, would make such a plan appear to us as undesirable.

An irrigation district can not be maintained without expense, but we avoid unnecessary cost. Our district's employees, other than the directors, are a secretary and part time of a stenographer. We also pay an attorney a monthly retainer of \$50.

We pay the amounts annually due the United States in two installments, one due June 30 and the other due December 31. This gives us ample time to have the tax money paid to the county treasurer and credited to the district. But the United States considers no payment in default any year if paid by December 31, exacting no penalty for deficiency in the June installment.

Thus far the district has been able to pay the United States in full by December 31 of each year, although a number of individual water users are delinquent in their tax payments. We add to each assessment a certain percentage to make up estimated defaults. When the delinquent taxes are paid or the

land is sold for taxes, the proceeds of course operate to reduce the district's assessments.

Summing up the situation, I think our affairs are being handled in a very good way. Our relations with the service are very satisfactory. All expenditures by the service and in fact all matters of any importance are submitted to our board for consideration and recommendation. Of course we have our little local troubles just as all other projects have. We have a few kickers; however, they are mostly land speculators or people who would starve to death in a restaurant, folks who never could make good under any circumstances. And in addition we have some folks who are good, honest, hard workers who are having a hard time to keep going. These people are entitled to consideration and relief, and we have worked out a plan which we are submitting to the various projects, which we feel, if adopted, will give relief and consideration to those who are really entitled to it and at the same time not impair or disrupt the Reclamation Service.

Our relations with the service for the past few years force us to realize that the service itself is all right. The troubles we are confronted with are largely our own and are due to a lack of real understanding of our own affairs, a lack of cooperation among the farmers, a lack of attention to our laws, poor farming methods, etc. I firmly believe that if the farmer would conduct his business as efficiently as the service does theirs, then there would be little cause for complaint.

I do not know that the foregoing gives the information that Mr. Holgate had in mind. If not, and there is further information you desire, I shall be glad to furnish same.

Yours very truly,

KLAMATH IRRIGATION DISTRICT,
By A. L. WISHARD, *Secretary*.

Agricultural Conference in Interest of Projects.

Mr. C. S. Scofield, in charge of western irrigation, and Mr. A. C. Cooley, agriculturist in charge of demonstrations on reclamation projects, have called a conference of the agriculturists beginning January 15, at Washington, D. C. Project Managers Dibble, Minidoka project, Weiss, North Platte project, and Richardson, Newlands project, have been invited to attend. It is expected that a number of those in attendance will be requested to appear before the Congressional Irrigation Committee in connection with the consideration of bill S. 4187 and related matters.

Most of the reclamation projects will be represented by men fresh from the locality. For example, the conditions in Arizona and California will be discussed by E. G. Noble, superintendent of Yuma experiment station, Bard, Calif.; Colorado, by H. A. Ireland, agriculturist, from the Uncompahgre project; Idaho, by John Montgomery from Rupert, Idaho; Montana, by Dan Hansen, farm superintendent at Huntley; Nebraska, by James A. Holden, superintendent of the Scottsbluff Experiment Farm; Nevada, by L. E. Cline and F. B. Headley from the Newlands Experiment Farm, Fallon; New Mexico, by A. C. Cooley, who has lately spent some time on the Carlsbad and

Rio Grande projects; South Dakota, by Bayer Aune, superintendent of Belle Fourche Experiment Farm; Utah, by A. C. Cooley, whose office at home is in Salt Lake City; Washington, by C. C. Wright, of the Irrigation experiment station at Prosser; and Wyoming, by G. A. Wright, from the Shoshone project, Powell.

The transportation matters will be discussed by Charles J. Brand, former head of the Bureau of Markets, and financial conditions by W. D. Ellis, president of the Farm Loan Bank at Berkeley, Calif.

A detailed account of the conference will appear in the next issue of the RECLAMATION RECORD.

HELPING THE SETTLER LET GO.

IN order to assist water users on the Minidoka project, Idaho, to dispose of part or all of their land, two organizations have been formed recently, the Minidoka Project Improved Farms Co., covering lands in the Gravity Division, and the Burley Improved Farm Lands Co., covering lands in the Pumping Division. Project Manager Barry Dibble has written the following preliminary account of the organization and plans of the companies, under date of January 3:

Two companies have been formed, one on each division of the project, their plan of organization being the same. In general it is intended that the stockholders of the companies will be local people who are interested in the welfare of the project and who desire to see the rural communities prosper. The shares have been put at the nominal price of \$5 each. It is not intended to raise a very large amount of money from this source, but rather to secure the support of as many people as possible.

In selecting the board of directors an effort has been made to secure representatives from the various rural and town organizations; thus on the gravity division the Minidoka Project Improved Farms Co. has elected to the board two members of the board of directors of the Minidoka Irrigation District (which operates the gravity division), representatives of four of the granges, one of the county commissioners, the president of the Rupert Commercial Club, president of the Paul Commercial Club, a representative of the Rupert Rotary Club, and the manager of a large mortgage company which operates on the project.

It is expected that the company will be self-supporting after the commissions from the sale of the lands begin to come in. In the meantime it is hoped that the mortgage companies, railway, sugar companies, and other organizations which have large interests in the development of the project will advance enough money to keep the concern operating. It is expected that the options will be secured with comparatively little direct expense. The manager of the Minidoka Irrigation District has been elected manager of the company and the secretary of the district will serve as secretary of the company for the time being. The district under the Idaho Statutes is not permitted to contribute funds to an organization of this kind, but the contribution of services and quarters is of course just as great a help.

We have been rather surprised at the inquiries already received for farm lands. The Rupert company only completed its organization last week and has not yet gone out actively for options; however, the newspapers have given considerable publicity to the scheme and already people are beginning to come

in looking for a chance to pick up property that is being offered for sale. In taking options it is planned to have each piece of land which is offered carefully examined by a board of appraisers, selected from the directors of the company. These men will pass upon the option price and unless the price is one that they can recommend to the prospective purchasers the option will be returned to the landowner. As we have discussed it among ourselves we feel that the rule should be that the price must be such that each of the appraisers would feel that if he were in the market looking for a farm, knowing all the conditions surrounding the project, he would regard the option price as one that he would be justified in paying. It is recognized that many farmers will value their land at figures so high that we would not be warranted in recommending them to outsiders. Our people who are helping to organize the company are willing to take the responsibility of rejecting this sort of options. When it comes to selling the farms it is planned to select the purchasers in the hope that we may obtain men who will be able to make a success once they are located on the project.

We hope that within the next 30 or 60 days we will have sufficient progress to permit the preparation of a report based on something besides expectations.

The articles of incorporation are as follows:

ARTICLES OF INCORPORATION OF MINIDOKA PROJECT IMPROVED FARMS COMPANY.

Know all men by these presents, that we, whose names are subscribed hereto, each being a bona fide resident of the State of Idaho, do, pursuant to the general corporation laws of the State of Idaho, associate ourselves together for the purpose of forming a corporation, and to that end execute the following articles of incorporation, and we do hereby set forth and declare as follows:

First. That the name of this corporation is, and shall be, Minidoka Project Improved Farms Co.

Second. That the purposes for which this corporation is formed are:

(a) To promote the further settlement and development of the Minidoka project of the United States Reclamation Service within the counties of Minidoka and Cassia in the State of Idaho and to that end to advertise and in all lawful ways and means call to the attention of the prospective purchasers of land the advantages of said Minidoka project;

(b) To accept from persons owning land in said Minidoka project in the said counties of Minidoka and Cassia, options on land owned by them and to assign and transfer such options to such persons as may desire to purchase;

(c) To effect sales of land in said Minidoka project, to interest prospective purchasers and to cause them

to remove to said Minidoka project; to introduce to landowners prospective purchasers; to execute as agent and on behalf of principals represented by the company contracts of sale or of purchase;

(d) To act as the agent of owners or prospective purchasers in the sale or purchase or exchange of farm lands; to accept listings as a real estate broker and to enter into other forms of contract relative to the purchase or sale of real estate and generally to carry on and conduct a general brokerage agency, and commission business for others in the purchase, sale, exchange, and management of real and personal property for others;

(e) To solicit and accept money of individuals, firms, associations, or corporations for the purpose of loaning or investing the same; to solicit, accept, and approve or reject applications for loans of the funds of this corporation and others and to take such action as may be necessary to complete such loans;

(f) To solicit and accept applications for insurance of every kind and to issue, on behalf of companies represented by this corporation, policies of insurance, and to act as agent and representative of every kind of insurance company;

(g) To borrow money and to issue bonds or other evidences of indebtedness and to secure the payment of the same by pledges or mortgages or deeds of trust of or upon the whole or any part of the property of the corporation; to sell, hypothecate, mortgage or lease all or any part of the property, real, personal or mixed, which the corporation may acquire;

(h) To acquire by purchase or otherwise, the property, rights, franchises and privileges of other corporations or individuals; to issue, purchase, hold and reissue the shares of stock of this corporation; and

(i) Generally, for the purpose of attaining or furthering any of the objects of its creation, including those implied or incidental to the express purposes hereinbefore enumerated, to do and perform any and all acts, things and business, and to exercise any and all other powers which may be or appear to be necessary or convenient for the successful prosecution of the purpose of the corporation or incidental thereto and which may be done or performed by a corporation of this character.

Third. That the place where the principal business of this corporation shall be transacted is Rupert, in the county of Minidoka, State of Idaho.

Fourth. That the term for which this corporation is to exist is 50 years from and after the date of its incorporation.

Fifth. That the corporate powers of this corporation shall be vested in a board of 11 directors to be selected annually from the stockholders of this corporation. The board of directors shall appoint an executive committee of five from the membership of said board of directors, and that said executive committee shall have all the powers, rights and privileges of the board of directors. The acts of such executive committee shall be in all matters valid as against the corporation. The executive committee shall meet at such times and places as may be provided for in the by-laws of this corporation.

Sixth. That the amount of the authorized capital stock of this corporation shall be \$25,000, divided into 5,000 shares of the par value of \$5 each, and the following-named persons have actually subscribed for the number of shares and in the amount set opposite their respective names, to wit:

Name.	Number of shares.	Amount.
R. L. Willis.....	1	\$5.00
Wm. Treiber.....	1	5.00
J. S. Martin.....	1	5.00
C. W. Brannon.....	1	5.00
W. C. Paul.....	1	5.00
Luke Williams.....	1	5.00
J. L. Rush.....	1	5.00
H. A. Baker.....	1	5.00
E. S. Sherrill.....	1	5.00
W. B. Hardy.....	1	5.00
Clinton Spencer.....	1	5.00
Rupert Abstract Co.....	1	5.00
J. C. Lundy.....	1	5.00

In witness whereof, we have hereunto set our hands this 29th day of November, 1922.

J. C. LUNDY.
R. L. WILLIS.
E. S. SHERRILL.
J. A. HANDY.
C. E. BOUSE.
LUKE WILLIAMS.

STATE OF IDAHO,
County of Minidoka, ss:

On this 29th day of November, 1922, before me, H. A. Baker, a notary public in and for said State, personally appeared John C. Lundy, R. L. Willis, E. S. Sherrill, J. A. Handy, C. E. Bouse, and Luke Williams, known to me to be the persons whose names are subscribed to the foregoing instrument and acknowledged to me that they executed the same.

In testimony whereof I have hereunto set my hand and notarial seal the day and year in this certificate above written.

H. A. BAKER,
[SEAL] Notary Public, Residing at Rupert, Idaho.

Recent Service Orders.

CIRCULAR LETTERS.

Nos.

1181. Billing freight shipments.
1182. Handling of transfer vouchers under consolidation of appropriation with project general accounts.
1184. Economic survey of conditions on projects.
1185. Form of potash prospecting applications.
1186. Penalties on account of delinquent water charges.
1187. Regulation governing use of telegraph and the payment of telegraph tolls.
1188. Monthly reports from projects, Form 7-341.

GENERAL LETTERS.

225. Cost reports; information requisite for the compilation of calendar year 1922 cost data.
226. Project operation and maintenance costs to December 31, 1922, with estimates and recommended charges for operation and maintenance or rental and for excess storage water for 1923.

ENGINEERING INVESTIGATIONS.

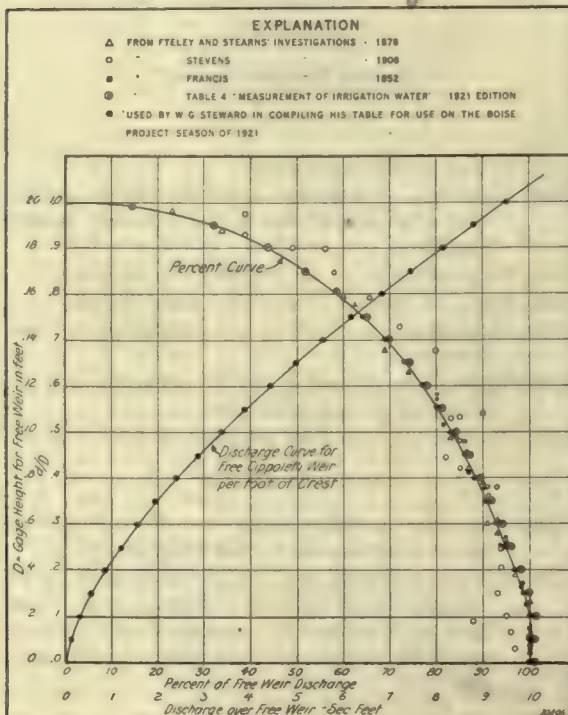
Diagrams for Submerged Cippoletti Weirs.

By W. G. Steward, Assistant Engineer, U. S. Reclamation Service.

ON nearly all the projects in the early days of the Reclamation Service trouble was experienced owing to the silting up of the measuring boxes, by which the weirs, instead of discharging freely, are made to act as submerged weirs. Although some experimental data were available on submerged sharp-crested rectangular weirs, no experiments in sharp-crested weirs of the Cippoletti type under conditions of submergence could be found. In 1908 and 1909 J. C. Stevens conducted an exhaustive study along this line on the Sunnyside Division, Yakima project, Washington, where the weirs at that time were of the Cippoletti type but with rounded crest.¹ Based upon these experiments, the diagram and tables accompanying this article were prepared in 1910 on the Boise project for use in connection with the hydrometric work on that project.

In order to devise a diagram that would be adaptable to field use, the data of the Francis, Fteley & Stearns and Steven's experiments were plotted on a diagram shown in the accompanying illustration.

¹ Engineering News, vol. 64, No. 7, Aug. 18, 1910, p. 171.



With values of $\frac{d}{D}$ as ordinates, where d is the depth of submergence in feet and D the head above the weir; and $\frac{Q}{Q'}$ as abscissæ, where Q is the actual discharge over the submerged weir for the experiment and Q' is the discharge over a free weir for the same head D , the points were plotted as shown on diagram. It can be seen that these points follow the slope of a curve and thus, by drawing this in, a curve is obtained from which per cent can be directly read.

As a matter of comparison between the points obtained by formula and those of experiments, the following method was used:

A Cippoletti weir is designed so that the triangular areas theoretically counteract the effect of end contraction, and the weir acts as though it were suppressed and rectangular.

The experiments of Fteley & Stearns were made on suppressed rectangular weirs and hence the coefficients as determined by them are the most applicable to the case of any available.

The following nomenclature is used:

d = depth of submergence in feet.

D = head above the weir.

Q = actual discharge over submerged weir in second-feet.

Q' = discharge over a free weir for the same head D in second-feet.

b = length of weir in feet.

g = acceleration due to gravity = 32.16.

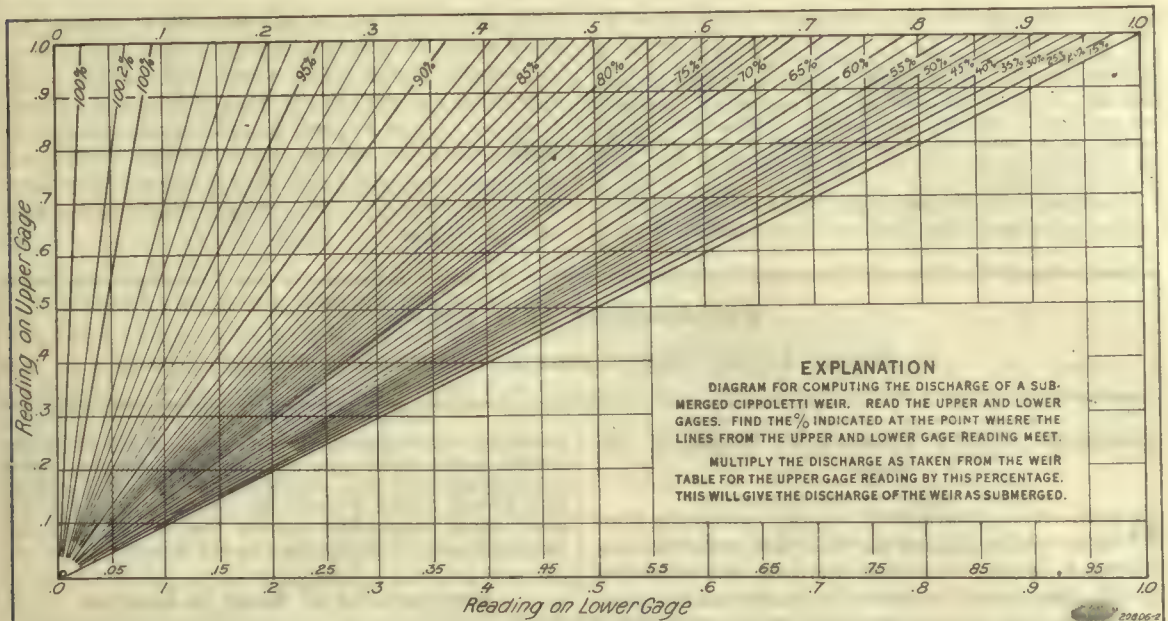
C = coefficient of discharge.

$M = C\sqrt{2g} =$ coefficient of discharge by Fteley & Stearns.

The formula for the discharge of submerged rectangular suppressed weir is $Q = C\sqrt{2g} b (D + \frac{1}{2}d) (D - d)^{1/2}$. The coefficients M as worked out by Fteley & Stearns are equal to $C\sqrt{2g}$, and thus the formula becomes $Mb (D + \frac{1}{2}d) (D - d)^{1/2}$. The Cippoletti formula for the discharge over a free weir is $Q' = 3.367 b D^{3/2}$. Thus by dividing Q by Q' we obtain the percentage of the discharge of a free weir that takes place over a submerged weir with the same head above the weir as on the free weir.

D was taken as 2 feet and the percentages figured for values of d from 0 to 2 feet.

The results were plotted in the same manner as in the previous case: $\frac{d}{D}$ as ordinates and per cent obtained by dividing Q by Q' as abscissæ. These points gave a regular curve, which followed the



points of Fteley & Stearns and also those of Francis very closely, and for percentages ranging from 100 to 75 are within 5 per cent of those of Stevens, but below that the points are a little further off.

In order to facilitate matters in obtaining the discharge while in the field, a discharge curve for a 1-foot free Cippoletti weir was plotted on this same diagram with gage height as ordinates and discharge as abscissæ.

Now by observing the head D above the weir and depth of submergence and obtaining $\frac{d}{D}$ the per cent is readily

Coefficients for submerged Cippoletti weirs.

[This table is made from Steward's curve, which is plotted from a mean of different experiments.]

$\frac{d}{D}$	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.998	0.999	1.000	1.000	1.001	1.001	1.002	1.002	1.001	1.000
.1	.999	.997	.995	.993	.991	.988	.985	.981	.977	.973
.2	.969	.965	.961	.957	.953	.948	.943	.939	.935	.931
.3	.927	.923	.919	.915	.911	.907	.903	.898	.893	.888
.4	.883	.878	.873	.868	.863	.858	.853	.848	.842	.836
.5	.830	.824	.818	.812	.806	.800	.794	.787	.780	.773
.6	.766	.759	.752	.745	.738	.730	.722	.714	.706	.697
.7	.688	.679	.670	.660	.650	.640	.629	.618	.607	.595
.8	.583	.571	.558	.545	.532	.518	.503	.487	.471	.453
.9	.435	.415	.395	.372	.347	.319	.287	.253	.205	.143

Example: Suppose it is desired to find the discharge over a submerged standard Cippoletti weir with a crest length of 1 foot when the head (D) on the upstream side is found to be 0.65 foot and the head (d) on the downstream side is found to be 0.37 foot. From the "Table for discharge over Cippoletti weirs," free, under the same head (0.65 foot) the discharge is 1.764 second-feet.¹ The ratio $\frac{d}{D} = .37 \div .65 = .569$, or approximately 0.57, for which the above table gives a coefficient of 0.787, then $0.787 \times 1.764 = 1.389$ second-feet, the discharge of the weir as submerged.

¹ Hydraulic and excavation tables, 5th edition, 1921, p. 89.

obtained by looking on the curve opposite the value of $\frac{d}{D}$ on the y axis. The discharge for a free weir with head D is taken from the discharge curve. The two results are multiplied together and the discharge of the submerged weir for the heads as read is obtained.

In order to read off the coefficient of discharge for submerged weirs directly, a chart has been prepared, as shown in the accompanying illustration, in which the ordinates are for the head above the weir " D " and the abscissæ are for the depth of submergence " d ." The per cent can be read off from this chart or can be obtained from the accompanying table.

THE VALUE OF RECLAMATION.

As Viewed by a Tennessee Congressman.

The Congressional Record of January 10 contains the following remarks by Hon. Clarence W. Turner, a Member of the House of Representatives from Tennessee, concerning the work of the Reclamation Service in general, and more particularly the Salt River project, Arizona:

Many millions of dollars have been spent in the West during the past few years on irrigation projects to make arid lands more valuable and to give better and more prosperous homes for the people.

Two summers ago while on a western trip I was told that the Roosevelt Dam, constructed by the Government for irrigation purposes, had cost the Government several millions of dollars and would or had reclaimed more than 100,000 acres of the most valuable land in the world. Can anyone say that this was a bad investment? I think not. The enhanced value

of this land, by reason of irrigation, will in a few years pay back to the Government all the money it expended and in addition will pay the State in which this project is located, and indirectly to the Nation, millions of dollars in taxes, by reason of increased values; and besides, it has provided many happy homes to farmers and their families who were fortunate enough to acquire land on this Nile of the West.

Representative Turner might have added to his excellent statement the fact that the 200,000 cropped

acres, more or less, on the Salt River project produced crops amounting to a gross value of more than \$111,000,000 during the 10 years, 1912 to 1921, representing 26 per cent of the total gross value of crops grown on all the projects of the Reclamation Service during the same period. As contrasted with a net cost of approximately \$10,500,000, the gross value of the crops grown on this project during the season 1921-22 amounted to \$12,898,000.

RECLAMATION LAW NOTES.

By Ottamar Hamele, Chief Counsel, U. S. Reclamation Service.

Assessment of City Property by Irrigation Districts.

RICHARD J. ERICKSON brought suit in the State of Nebraska against the Nine Mile Irrigation District and another, to enjoin the levy and collection of a tax for irrigation district purposes against property of the city of Bayard in said State. Injunction was granted by the trial court and upon appeal this action was affirmed by the supreme court of the State (*Erickson v. Nine Mile Irr. Dist.*, 190 N. W. 573). The following is the syllabus by the court in this case:

It is within the legislative discretion to provide that city or town lots within an irrigation district which are "occupied and used exclusively for other than agricultural purposes" shall not be assessed or taxed for irrigation district purposes, and the amendment (laws 1917, c. 80) to sections 3472 and 3473, Revised Statutes, 1913, so providing, is germane to the sections amended.

Assessments made by an irrigation district to pay bonded debts and for the maintenance and operation of its canal or ditch are special assessments, even though made in proportion to valuation, and not by acreage or frontage.

City and town lots within an irrigation district which use no water for irrigation are used exclusively for other than agricultural purposes, and receive no direct special benefit from the improvement, and may properly be distinguished from those lots susceptible of receiving and using water for a beneficial purpose and thus receiving direct special benefits.

Where bonds had been issued by an irrigation district under a statute which provides: "Such bonds, and the interest thereon, shall be paid by revenue derived from an annual assessment upon the real property of the district, and all the real property of the district shall be and remain liable to be assessed for such payments" (Rev. Stat., 1913, sec. 3471) such liability still exists upon all the real property then in the district, in favor of the bondholders, notwithstanding the subsequent passage of a statute exempting from taxation by irrigation districts city and town lots within the district used exclusively for other than agricultural purposes.

In an action brought to restrain the officers of an irrigation district from causing taxes upon lots which,

under the amended statute, are not liable to be assessed, such officers are not entitled to defend upon the ground that the amendment impairs the obligation of the contract with the holders of bonds, and with other taxpayers, neither the bondholders nor such taxpayers being parties to the action.

Appropriation of Water in Montana.

Intent to appropriate will be presumed from the diversion and use of the waters of a creek for irrigation purposes. Actual diversion of water from a creek and beneficial use existing or in contemplation constitute an appropriation. The amount of appropriation is gauged by the amount of water taken in at the head of the ditch, rather than by the amount actually delivered at the place of beneficial use, since the appropriator must make allowance for evaporation and seepage, and is entitled to appropriate the amount his ditch will actually deliver. An appropriator can not acquire a right to more water than his ditch will carry. In an action involving an adjudication of water rights in one creek, the mere fact that evidence disclosed rights claimed by plaintiffs for irrigation out of another creek did not authorize the court to require plaintiffs to first exhaust the rights in the other creek, since to so do would adjudicate rights of junior appropriators in the other creek not parties to the action. The use to which water is to be applied by an appropriator need not be immediate, but may be perspective and contemplated, so long as there is a bona fide intention to make a beneficial use of the water. (*Wheat v. Cameron*, 210 P. 761.)

Condemnation for Irrigation Purposes by Individuals.

Constitution, article 1, section 18, prohibiting by implication a taking of private property for private use is not violated by Oregon laws, section 5719, providing for condemnation of lands for irrigating ditches by private parties, or section 5720, giving

private parties the right to condemn and enlarge an existing irrigating ditch belonging to others to bring water also to condemners' lands, inasmuch as these sections contain no authority for condemnation and enlargement of an existing ditch, notwithstanding it occupies the only practicable route to condemners' lands, where condemners contemplate only irrigation of their individual lands, and there is to be no general use by all adjacent owners. (*Smith et al. v. Cameron*, 210 P. 716.)

Fraud in Acquiring Government Land.

One who, in pursuance of a scheme to acquire the land for himself, procures others to make homestead applications and entries, knowing that they have no intention to establish residence or otherwise comply with the law and that their proofs to the contrary, made with his connivance, and upon the faith of which the patents are issued, are false, is guilty of defrauding the United States of the value of the land. The right of the United States to recover damages for such a fraud is not defeated by the facts that the period of residence stated in the entry proofs was insufficient to comply with the statute and that, but for a mistake of law in that regard upon the part of the Land Department, the patents would not have issued. (*Jones v. United States*, 258 U. S. 40.)

Navigable Waters in Washington.

A private citizen in the State of Washington may enjoin the maintenance of a fence obstructing his use of a navigable lake. Pacific Lake, approximately 1½ miles long and one-half mile wide, with an average depth of 20 to 25 feet, is navigable. The test of navigability is not past commercial use, but capacity for such use. (*Lant v. Wolverton*, 210 P. 1.)

Navigable Waters in Kansas.

A State, vested by the act of admission to the Union with plenary jurisdiction and power over the beds of navigable streams within its borders, may establish such rules as it deems proper for the government of riparian rights along such streams. Whether a stream is navigable for the purpose of determining riparian rights therein, is not a question of present navigability in fact, to be determined by a jury in each case, but one of local law, which may give the stream a permanent status. The Arkansas River in Kansas, under the law of the State, is a navigable stream throughout its course, regardless of its navigability in fact at any particular place, and title to the bed of the stream is in the State, and not in riparian owners. (*Jackson-Walker Coal & Material Co. v. Hodges et al.*, 283 F. 457.)

Shore of Navigable Lake Defined.

A grant to the shore of Lake Erie means to the water's edge at its lowest mark; correctly speaking,

the word "shore" applies only to the land adjacent to the sea or other tidal waters; it is the space or ground over which the tide ebbs and flows, and is bounded by the high and low water mark; by the "shore" of a lake unaffected by tides is meant the land adjacent to the water, and in the absence of banks or other highlands to mark the boundary the only definite line is the water's edge. (*La Porte et al. v. Menacon et al.* (Mich.), 190 N. W. 655.)

When Government Parts with Title to Land.

The Government parts with its title upon signature of the patent and making the last entry in the record of the Department of the Interior. That passes the title. It is not like the passing of the title from one individual to another; the delivery is not essential. (*United States v. Frank Black Spotted Horse*, 282 F. 349.)

Adjudication of Water Rights.

In Nevada a valuable water right will not generally be adjudicated in a proceeding incidental to another main cause, such as a contempt proceeding. (In re rights to waters of Barber Creek and its tributaries in Douglas County, 210 P. 563.)

Irrigation Ditch on School Section.

Where an irrigation ditch has been constructed across a school section in the State of Idaho, the State only can attack the user's right to such right of way. (*Swan et al. v. Sproat et al.*, 209 P. 1070.)

Settlement of Claims Against Government.

An Act To provide a method for the settlement of claims arising against the Government of the United States in sums not exceeding \$1,000 in any one case. (Act Dec. 28, 1922, Public No. 375, 42 Stat. —.)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That when used in this Act the terms "department and establishment" and "department or establishment" mean any executive department or other independent establishment of the Government; the word "employee" shall include enlisted men in the Army, Navy, and Marine Corps.

Sec. 2. That authority is hereby conferred upon the head of each department and establishment acting on behalf of the Government of the United States to consider, ascertain, adjust, and determine any claim accruing after April 6, 1917, on account of damages to or loss of privately owned property where the amount of the claim does not exceed \$1,000, caused by the negligence of any officer or employee of the Government acting within the scope of his employment. Such amount as may be found to be due to any claimant shall be certified to Congress as a legal claim for payment out of appropriations that may be made by Congress therefor, together with a brief statement of the character of each claim, the amount claimed, and the amount allowed: *Provided*, That no claim shall be considered by a department or other independent establishment unless presented to it within one year from the date of the accrual of said claim.

SEC. 3. That acceptance by any claimant of the amount determined under the provisions of this Act shall be deemed to be in full settlement of such claim against the Government of the United States.

SEC. 4. That any and all Acts in conflict with the provisions of this Act are hereby repealed.

Bills Relating to Federal Reclamation.

IN THE HOUSE.

H. R. 12816.—"A bill to provide adjusted compensation for veterans of the World War, through a tax on the manufacture, importation, and sale of beer and light wines, and for other purposes," introduced November 20, 1922, by Representative Fred A. Britten of Illinois.

H. R. 13315.—"A bill authorizing a preliminary examination and survey of the Columbia and Snake Rivers," introduced December 9, 1922, by Representative Nicholas J. Sinnott, of Oregon.

H. R. 13344.—"A bill to create a waterways commission," introduced December 12, 1922, by Representative H. Garland Dupré, of Louisiana.

H. R. 13480.—"A bill granting the consent and approval of Congress to the Colorado River compact," introduced December 18, 1922, by Representative Frank W. Mondell, of Wyoming.

H. R. 13550.—"A bill authorizing the Secretary of the Interior to enter into a contract with the Elephant Butte irrigation district of New Mexico and the El Paso County improvement district No. 1, of Texas, for the carrying out of the provisions of the convention between the United States and Mexico, proclaimed January 16, 1907, and providing for compensation therefor," introduced December 22, 1922, by Representative C. B. Hudspeth, of Texas.

H. R. 13559.—"A bill making appropriations for the Department of the Interior for the fiscal year ending June 30, 1924, and for other purposes," introduced December 22, 1922, by Representative Louis C. Cramton, of Michigan.

IN THE SENATE.

S. 4034.—"A bill to authorize the Secretary of the Interior to extend the time for payment of charges due on reclamation projects, and for other purposes," introduced November 21, 1922, by Senator Charles L. McNary, of Oregon (for Senator Samuel D. Nicholson, of Colorado).

S. 4061.—"A bill authorizing the Secretary of the Interior to enter into an agreement with Toole County irrigation district, of Shelby, Mont., and the Cut Bank irrigation district, of Cut Bank, Mont., for the settlement of the extent of the priority to the waters of Two Medicine, Cut Bank, and Badger Creeks, of the Indians of the Blackfeet Indian Reservation," introduced November 23, 1922, by Senator Thomas J. Walsh, of Montana.

S. 4082.—"A bill to authorize the Secretary of the Interior to extend the time for payment of charges due on reclamation projects and for other purposes," introduced December 4, 1922, by Senator William E. Borah, of Idaho.

S. 4121.—"A bill authorizing a preliminary examination and survey of the Columbia and Snake Rivers," introduced December 8, 1922, by Senator Charles L. McNary, of Oregon.

H. R. 12817.—Amendment dated December 5, 1922, to extend time for repayment of construction charges on all Government reclamation projects intended to be proposed to this bill by Senator William E. Borah, of Idaho.

H. R. 12817.—Amendment dated December 12, 1922, containing land reclamation provision for soldiers, intended to be proposed to this bill by Senator Furnifold M. Simmons, of North Carolina.

S. 4187.—"A bill to extend the time for payment of charges due on reclamation projects and for other purposes," introduced December 15, 1922, by Senator Charles L. McNary, of Oregon.

S. 4187.—Amendment dated December 20, 1922, to extend time for payment of charges on reclamation projects, intended to be proposed to this bill by Senator John B. Kendrick, of Wyoming.

S. 4232.—"A bill authorizing the Secretary of the Interior to enter into a contract with the Elephant Butte irrigation district of New Mexico and the El Paso County improvement district No. 1 of Texas for the carrying out of the provisions of the convention between the United States and Mexico, proclaimed January 16, 1907, and providing for compensation therefor," introduced December 27, 1922, by Senator Holm O. Bursum, of New Mexico.

H. R. 13559.—Amendment regarding certain Paiute Indian lands, dated December 27, 1922, intended to be proposed to this bill by Senator Tasker L. Oddie, of Nevada.

S. 4251.—"A bill for the disposition of refractory lands on the Huntley irrigation project in the State of Montana," introduced December 30, 1922, by Senator Thomas J. Walsh, of Montana.

MAP MAKING BY THE AERIAL PHOTOGRAPHIC METHOD.

AERIAL photography as applied to the production of maps is beginning to attract considerable attention, and in some parts of the United States, notably California, is finding application in various forms. A method evolved in a recent survey of the Tennessee River is of particular interest because of its simplicity and low cost, and its adaptability to surveys for irrigation, drainage, and hydroelectric projects in which, as a rule, large areas have to be covered.

The new method consists in taking vertical photographs from an airplane flown at such altitude as will cause the pictures to be at very nearly the desired scale. Surveyors then take the photographs into the field and check the scale of measuring distances between a few prominent natural objects, and then proceed to plat contours on them by the ordinary plane table and stadia method. This process is exceedingly simple and requires some skill in drafting but comparatively little experience in surveying. The only preliminary work required is the establishment of such bench marks as will be needed in taking the topography. In the survey of the Tennessee River no triangulation or other form of control was found to be necessary. The map is compiled by tracing off onto linen the information contained on the photographs. In order that no distortion may take place, a so-called skeleton control is first worked out graphically by a geometrical process in which the photographs only are used. This process, if carried out

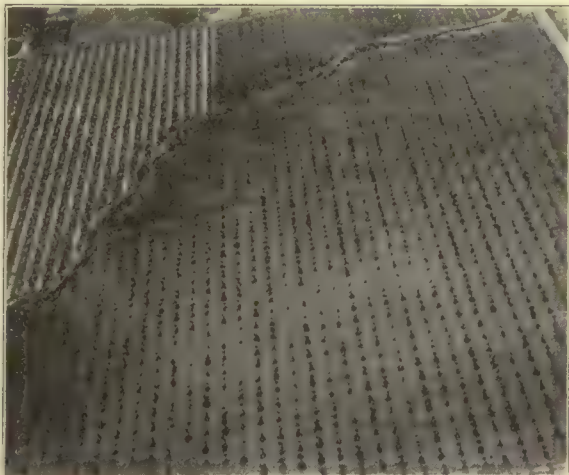
with care, eliminates the distortions introduced by tilting of the camera, corrects displacements of objects due to differences in elevation of the ground surface, and makes allowance possible for discrepancies in scale. It assembles the photographs in proper position with respect to each other and furnishes a framework in which the detail can be filled in to any desired extent. The resulting maps have been found to possess an accuracy fully equal to that obtained by standard surveying methods, and in the matter of faithfulness and completeness of detail are superior to the old time maps, at the same time being quite reasonable in cost.



Aeroplane view of Orland, on Orland project, California.

The survey of the Tennessee River was in the immediate charge of Gerard H. Matthes, assistant engineer for the War Department. Mr. Matthes, who did considerable topographic mapping in the early days of the Reclamation Service, is enthusiastic over the prospects of aerial photographic surveying, and is of the opinion that it will rapidly take the place of the time honored surveying methods. He is at present engaged in organizing a survey of some 500 square miles in Alabama for a hydroelectric company by much the same method that was used on the Tennessee River, and is introducing aerial photographic surveys elsewhere.

Aerial photography has been found to be especially suited to making reconnaissance maps. Where a landing field can be provided within 100 miles of the lands to be mapped, three hours work in an airplane will usually suffice to map from 50 to 100 square miles, depending upon the scale of the map. If the photographs are taken so as to lap on each other by a liberal amount, a fairly reliable map can be built up in mosaic form without any instrumental survey whatever. By running a few traverse lines to furnish



Aeroplane view of young orchard, Orland project, California.

a check on the scale of the pictures, such a mosaic map can be made quite accurate; the topographic forms can be studied with the aid of the stereoscope, and the amount of information so furnished is truly remarkable.

"Reclamation and irrigation projects, where waste land may be made available for settlement and productivity, are worthy of your favorable consideration."—*President Harding in his address to Congress on December 8, 1922.*

Beet digging on the Strawberry Valley project began October 9. Schools were closed for a week or two beginning October 16 to allow the pupils and teachers to help with the beet harvest.

Broom corn of excellent quality has been raised on the Huntley project, Montana. A small broom factory at Pompey's Pillar turned out from three to four dozen brooms per day.

On November 24, 1922, at Santa Fe, N. Mex., a compact, to bring about the expeditious agricultural and industrial development of the Colorado River Basin, the storage of its waters, and the protection of life and property from flood, was signed by representatives of the United States, Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming.

ADMINISTRATIVE AND STATISTICAL PROGRESS REPORTS FOR DECEMBER, 1922.

Monthly conditions of principal Reclamation Service reservoirs for December, 1922.

(Elevation above sea level.)

State and project.	Reservoir.	Available capacity in acre-feet.	Elevation.		Storage in acre-feet.			Out-flow in acre-feet.	Elevation of water surface.		
			Spill-way crest. ¹	Lowest gate sill. ²	Beginning of month.	End of month.	Maximum.		Beginning of month.	End of month.	Maximum.
Arizona, Salt River.....	Roosevelt ³	1,305,000	2128.1	1924.6	500,122	549,144	549,862	.....	2085.04	2089.95	2090.02
California, Orland.....	East Park.....	51,000	1189.68	1111.68	1,036	15,290	15,290	.....	1140.72	1172.58	1172.58
Idaho:											
Boise.....	Arrowrock.....	280,000	3211	2500	17,584	34,334	34,334	28,686	3051.6	3079.2	3079.2
	Deer Flat.....	177,000	2518	2488	25,575	49,096	49,649	.....	2496.6	2501.4	2501.5
Minidoka.....	Lake Wolcott.....	95,180	4245	4236	89,940	89,830	90,180	368,027	4244.55	4244.54	4244.57
	Jackson Lake.....	847,000	6779	6728	285,930	314,240	314,240	.....	6745.07	6746.4	6746.4
Montana:											
Milk River.....	Nelson.....	70,000	2223	2200	28,400	27,300	27,300	.....	2212.97	2212.55	2212.97
St. Mary storage.....	Sherburne.....	66,000	4788	4720	.....	.....	.....	.....	.....	.....	.....
Sun River.....	Willow Creek.....	16,700	4130	4025	11,847	11,847	11,847	180	4124.9	4124.9	4124.9
Nebraska-Wyoming, North Platte.....	Pathfinder.....	1,070,000	5852	5670	277,480	296,100	296,100	4,869	5794.53	5796.9	5796.9
	Lake Alice.....	11,400	4182	4159	7,699	6,689	7,699	.....	4176.8	4175.2	4176.8
	Lake Minatare.....	60,760	4125	4074	42,671	42,117	42,671	.....	4116	4115.7	4116
Nevada, Newlands.....	Lake Tahoe.....	120,000	6224	6224	.....	.....	.....	720,350	6225.22	6225.82	6225.82
	Lahontan.....	273,600	4162	4060	179,080	200,600	200,600	.....	4150.6	4153.6	4153.6
New Mexico:											
Carlsbad.....	McMillan.....	45,000	3267.7	3241.6	5,250	8,700	8,700	.....	3257.7	3259.1	3259.1
Rio Grande.....	Elephant Butte.....	2,638,000	4407	4231.5	1,464,074	1,441,084	1,464,074	38,016	4372	4371.2	4372
Oregon, Umatilla.....	Cold Springs.....	50,000	621.5	590	1,200	3,975	3,975	.....	565.98	574.28	574.28
Oregon-California, Klamath.....	Clear Lake.....	462,000	4540	4514	358,000	358,000	358,000	.....	4536	4536	4536
South Dakota, Belle Fourche.....	Belle Fourche.....	203,000	2975	2920	73,100	102,200	102,200	.....	2958.5	2960.1	2960.1
Utah, Strawberry Valley.....	Strawberry.....	250,000	7558	7517	204,100	206,900	250,000	.....	7551.6	7552	7558
Washington:											
Okanogan.....	Conconully.....	14,400	1100	2232	2,115	2,346	2,346	.....	2255.3	2256.3	2256.3
Yakima.....	Bumping Lake.....	34,000	3426	3389	3,785	11,550	11,550	.....	3394.9	3405.4	3405.4
	Lake Cle Elum.....	20,800	2134	2122	13,210	26,660	26,660	.....	2129	2135.1	2135.1
	Lake Kachess.....	210,000	2258	2192	36,470	50,200	50,200	.....	2205.9	2210.7	2210.7
	Lake Keechelus.....	152,000	2515	2425	20,320	38,365	38,365	.....	2440.9	2454.5	2454.5
Wyoming, Shoshone.....	Shoshone.....	456,600	5360	5132.3	339,386	330,798	339,386	20,209	5340.6	5339	5340.6

¹ Or maximum storage.² Or zero storage.³ Zero water depth at elevation 1902.2.⁴ Amount of silt shown by silt survey deducted from original capacity.⁵ Proposed regulation.⁶ Estimated low-water limit under proposed plan of regulation.⁷ Draft for power purposes.⁸ Elevation of reservoir raised 12 inches by stop logs in spillway.

SALT RIVER PROJECT, ARIZONA.

The two regular crews in the field during December, with a daily average of 58 man-days and 13 stock-days, accomplished the following maintenance work: 18 miles main canal cleaned, 35 miles lateral cleaned, 60 old structures repaired, 865 feet riprap placed, 9 cubic yards concrete placed, 59 cubic yards earth excavated, 61 cubic yards earth embankment placed.

In addition, the Ruth dredger bermed 8,900 linear feet, moving approximately 1,683 cubic yards.

The P. & H. one-half yard machine enlarged 1,320 linear feet of the Old Cross Cut Canal and regraded 520 linear feet. On December 16 the machine moved to Lateral 13 and the Arizona Canal, Cave Creek, Wash., and started excavating sand deposited in Arizona Canal by Cave Creek flood of December 12.

With a daily average of 27 man-days and 2 stock-days, the following construction work has been accomplished from maintenance camps: 1½ miles new ditch built, 19 new structures installed, 1,467 cubic yards earth excavated, 59 cubic yards concrete placed, 328 linear feet concrete pipe placed, 94 linear feet corrugated iron pipe placed.

Work continued on widening the Eastern Canal; day and night powder crews drilled 3,476 feet and shot 3,302 feet of holes. The Monighan, 2-yard

machine, and Lidgerwood, 1½-yard machine, moved 9,751 cubic yards of material.

On December 13 work was started on the Cross Cut Drain, and the following work accomplished, with daily average of four man-days 1,341 linear feet trench excavated by Austin trencher, and 1,341 linear feet 10-inch pipe laid.

Operation of power system.—Total power generated during month, 2,360,465 kilowatt-hours; maximum daily output (December 30), 115,550 kilowatt-hours; maximum load (December 14), 5,910 kilowatt-hours; maximum daily average load (December 30), 4,814 kilowatt-hours; highest daily load factor, 97.1 per cent; lowest daily load factor, 60.7 per cent; monthly load factor, 53.7 per cent.

No power was furnished to the Inspiration Consolidated Copper Co. during the month.

The output of the power system was exceptionally low during the month, as there was no demand for stored water during the first 26 days. Flood water in varying amounts from the Verde River was available for the Cross Cut plant during most of the month.

The Roosevelt power plant was shut down most of the month, as no water was available for power. The Cross Cut plant operated continuously. The South Consolidated plant operated 675.4 hours. The Arizona Falls plant operated only 12.5 hours; the plant.

was shut down practically all of the month, owing to lack of water in the Arizona Canal. The Chandler power plant operated 699.6 hours.—*C. C. Cragin.*

YUMA PROJECT, ARIZONA-CALIFORNIA.

There was no frost damage in December. Peas grown in the valley were put on the market as early as the 15th, but pickings were not yet heavy. Garden truck was in excellent condition. Alfalfa was being cut and was in fine shape.

The 30-B Bucyrus cleaned 1.2 miles on the main drain. The P. & H. dragline cleaned 4,000 feet on East Main Canal and the four Ruth dredges cleaned 26.2 miles of laterals.

The maximum discharge of the Colorado River was 9,900 second-feet, minimum discharge 6,100 second-feet, total run-off being 455,000 acre-feet. The discharge for December 31, was 7,450 second-feet and gauge height 16.02.

Mesa division.—Work on the manufacture of concrete pipe was begun December 22; 84 pieces of 18-inch pipe were poured. Work was begun on the turnout for Lateral B-12-2.

The contractor on the earthwork made excellent progress during the month. Work was started with a full force on December 18, at the end of the month approximately 30,000 cubic yards of a total of 66,000 cubic yards had been moved. At the present rate of progress the work will be completed ahead of the contract time.

The 16-inch Krogh pump was operated 131.5 hours, pumping 196 acre-feet.—*Porter J. Preston.*

ORLAND PROJECT, CALIFORNIA.

Several rain storms occurred in December, during which 4.59 inches of precipitation fell at Orland, 1.34 inches in excess of the December mean. The seasonal precipitation to date at Orland amounts to 10.79 inches, about 60 per cent of the normal annual rainfall. Some snow fell on December 9 at Orland, while a depth of 3 inches, which remained on the ground for two days, fell 10 miles west of the town.

The rainy weather interfered to a considerable extent with the supplemental work of placing concrete lining, the force being able to work only 16 days, during which 14,000 square yards of lining were placed on 1.8 miles of project laterals. The average force employed consisted of 43 men and 22 head of stock. Maintenance work consisted of cleaning and repairing 21.4 miles of concrete-lined sections by hand and cleaning 4.2 miles of earth sections by means of teams. The force, averaging 10 men and 6 head of stock, were able to work 20 days. The East Park Feed Canal was placed in operation on December 3, and 5,800 acre-feet of water were diverted from Stony Creek and delivered at East Park Reservoir.

During December, the Orland Unit Water Users' Association remitted in full both the seventh installment of the building charge of the project and the minimum operation and maintenance charge for the season of 1922, which, combined with the excess water collections, netted a return of \$101,225 to the reclamation fund from the Orland project.—*R. C. E. Weber.*

GRAND VALLEY PROJECT, COLORADO.

December weather was exceptionally mild and conditions were favorable for outside work.

The last of the sugar beet crop was harvested and most of last season's crops had been marketed, with the exception of a part of the hay crop and some of the apples which were in storage. Alfalfa was in fair

demand at a price of about \$10 per ton in the stack. A first payment of \$7 per ton had been made on sugar beets and it was expected that the total will reach at least \$8.

The only operation and maintenance work undertaken on the gravity division was the repair of structures and miscellaneous jobs on the Main Canal and laterals by a force of six men. Two Monighan dragline excavators were operated during most of the month on the construction of drains in the vicinity of Loma and Mack. Twenty-one hundred linear feet of drain were completed, involving 8,400 cubic yards of excavation.

Construction work on the Orchard Mesa siphon and flume was continued with a force of about 50 men. Excavation for the siphon was completed from the upper end to a point in the bed of the river below the railroad. Placing of concrete was started on the 22d and 170 cubic yards were placed during the month. In the excavation for the flume bench 2,100 cubic yards of rock and earth were moved. Work was continued on seasoning the canyon division of the Main Canal.—*S. O. Harper.*

UNCOMPAGNE PROJECT, COLORADO.

Five snowfalls occurred during December, making a total precipitation of 1.3 inches. This precipitation is 0.56 of an inch more than the normal over a period of three years. The total precipitation during the year amounted to 7.49 inches, which amount is 2.03 inches less than the average for this section.

The uncollected water rentals due from the season 1921 on December 31 amounted to \$3,326, and the total cash collections to December 31 on account of water rentals for the season 1922 amounted to \$70,579. Owing to the mild weather which prevailed there was the usual demand for stock water, and as a result all project canals and laterals with the exception of the South Canal system were supplied with stock and domestic water continuously.

The crop census was completed by the ditch riders and tabulation of the results was carried on in the office. The repair work to the Three Drops section below the Gunnison Tunnel was completed with the exception of the facing to Drop No. 3. This work was discontinued at the end of the month on account of cold weather, and will not be resumed until spring. Two 16-foot sections of the Ironstone Bench flume on the sidehill west of Olathe were removed, leveled, and replaced with a double floor in order to prevent excess leakage. Several drain trenches were excavated to protect the lower bank of the Ironstone Canal sections at critical points.

Several of the West Canal metal flumes were overhauled, which required the replacement of a number of carrier beams, and the working over of the joints, especially on the truss sections. The P. & H. dragline continued the cleaning and enlargement work on the Loutsenhizer Canal, 10,546 cubic yards being excavated. Two shifts were operated from the 4th of the month in order to accomplish as much of the cleaning as possible before winter conditions set in.

The supply of cars was sufficient for all demand, but on account of low prices little of the stored crops were moved to market.—*L. J. Foster.*

BOISE PROJECT, IDAHO.

The mean temperature during December was below normal. The precipitation was well distributed, and was about normal.

There was little change over the previous month in labor conditions. There were a number of idle men

with little prospect of new work opening up before spring.

Work on the farms was confined principally to the care of live stock. A large number of sheep were being wintered on the project, which created a demand for all of the hay locally.

The run-off from Boise River watershed was about 78 per cent of normal. December storms deposited a large amount of snow in the mountains, but the aggregate was still below normal.

Water for filling Deer Flat Reservoir was run through the Main Canal from the 1st to the 14th, when it was turned out on account of ice conditions. Later in the month the weather moderated, and the water was again turned in on the 30th. Maintenance work consisted of miscellaneous repairs to structures.

The construction of the Upper Mason Creek Drain was continued with the Austin No. 4 drag line. Good progress was made except for three days during the middle of the month, when frost conditions interfered somewhat with the work.

A small amount of field work was in progress in connection with the drainage work under way, and seepage investigations in various parts of the project. Office work was continued in connection with the Malheur secondary investigations.

Merchants report a very satisfactory holiday trade, with a total of sales greater than last year. Selling on credit is noticeably on the decrease, and the percentage of cash sales on the increase.—*J. B. Bond.*

KING HILL PROJECT, IDAHO.

December weather was as favorable for construction work as could be expected at this season. Temperatures above freezing were recorded during all but seven days.

Government forces averaged 275 men working from 7 camps.

On schedules 5 to 11 of Main Canal enlargement, 2,000 cubic yards of class 3 material were moved, and 900 cubic yards class 3 on schedule 36 of Main Canal extension; 7.9 miles of laterals were completed, entailing the excavation of 21,940 yards of class 1 material; 4,216 cubic yards of class 1 were removed in connection with canal and lateral structures, 2,400 yards of which were handled by the P. & H. No. 206 drag line; 850 linear feet of reinforced concrete lining was placed in the Main Canal.

In connection with repairs to siphon No. 1 the old inlet structure was torn out and 50 per cent of the excavation for new structure was completed. All wood-stave pipe in this structure except that on the river bridge was dismantled and remilling of the staves begun.

A crew engaged throughout the month on minor structures installed 6 drops, 4 canal turnouts, 3 checks, and 9 farm turnouts. This work involved the excavation of 1,760 yards of class 1 material, placing of approximately 38,000 feet of timber, 596 cubic yards backfill and 1,164 square yards of rock paving.

The lock-joint pipe factory was cleaned up, necessary additions made, and put in readiness for operation.

Contract forces excavated approximately 21,000 cubic yards class 1 material. Temple Bros. completed schedules 36 to 45, inclusive, and F. E. Wilson completed his contract for schedules 52, 53, 55, and 57 to 63, inclusive. G. M. Brown on schedules 46 to 50, inclusive, had completed 80 per cent of his contract.

R. A. Coffelt completed 50 per cent of the earthwork for $\frac{1}{2}$ E. siphon during the month. One hundred twen-

ty-five cubic yards of gravel were hauled to 6 E. turnout and chute by R. F. Payne, under contract.

Three miles of the Slick feeder ditch was completed during December and timber flumes on this ditch repaired. Brush riprap was placed at a number of points along the canal where scouring had occurred.—*A. M. Raven.*

Prevailing crop prices at close of December, 1922.

Project.	Alfalfa hay, per ton.		Barley, per bushel.	Oats, per bushel.	Wheat, per bushel.	Pota- toes, per bushel.
	In stack.	Baled at shipping point.				
Salt River.....	\$18-20	\$22-26	\$0.92	\$0.62	\$1.20	.....
Yuma.....	15.00	19.00	.....	.....	.....	.....
Orland.....	13.50	16.50	.67	1.22	1.26	.....
Grand Valley.....	10.00	13.00	.....	.65	1.10	\$0.35
Uncompahgre.....	7.00	.....	.75	.53	.96	.15
Boise.....	8.00	11.00	.55	.45	.84	.20
King Hill.....	10.00	.....	.....	.....	.....	.36
Minidoka.....	7-9	10-12	.75	.84	.96	.25
Huntley.....	8.00	.....	.....	.....	.96	.25
Milk River.....	10.00	13.00	.34	.42	1.08	.40
Sun River.....	10.00	15.00	.60	.60	.99	.30
Lower Yellow- stone.....	8-10	10.00	.36	.25	1.04	.25
North Platte.....	10-12	.....	.....	.....	.....	.48
Newlands.....	11.00	15.00	.75	.....	1.20	.....
Carlsbad.....	.....	25.00	.....	.....	.....	.....
Rio Grande.....	.....	23-28	.....	.....	.....	.....
North Dakota pumping.....	15.00	.....	.....	.....	1.03	.40
Umatilla.....	12.00	17.00	.....	.....	.....	.60
Klamath.....	10.00	.....	.72	.64	1.08	.....
Belle Fourche.....	5.00	12.00	.....	.37	.95	.75
Strawberry Valley.....	11.00	14.00	1.00	.75	1.05	.....
Okanogan.....	.....	.....	.....	.....	.....	.60
Shoshone.....	.....	16-18	.....	.60	.85	.30
Indian projects:	.....	13.50	.....	.....	.....	.....
Blackfoot.....	10.00	.....	.67	.45	.93	.90
Flathead.....	12.00	16.00	.....	.....	.95	.30
Fort Peck.....	10.00	.....	.....	.20	1.08	.50

MINIDOKA PROJECT, IDAHO.

Dry weather continued throughout December.

Early in December the Burley sugar factory finished its campaign for the season and closed down. The total quantity of beets cut was 39,332 tons. Beets grown in the Paul district were shipped to Twin Falls for cutting. There were 26,088 tons of these beets, making a total of 65,350 tons grown on the project. On December 15 the sugar company made its second payment for beets delivered at the Burley factory amounting to about \$200,000, and on the 20th it distributed a bonus of 75 cents per ton, anticipating the payment due in February under its contract with the beet growers.

The annual crop report was compiled. The change in due date for the operation and maintenance charges from March 1 to December 31 resulted in considerable activity in collections.

At American Falls, one survey party was engaged in making surveys of right of way along the north and west sides of the reservoir.—*Barry Dibble.*

HUNTLEY PROJECT, MONTANA.

Unsettled, cold, stormy weather prevailed during the early part of December. The later part proved exceptionally mild, permitting outside field work to be done.

The financial situation on the project was further complicated by the failure on December 4 of the Ballantine State Bank. It is believed, however, that

conditions have settled again and that no further disturbances of this character will occur.

Minor drainage work was done and repairs to Sand Creek flume were continued.—*A. R. McGinness.*

MILK RIVER PROJECT, MONTANA.

Severe cold weather with some snow prevailed for the first 20 days of December. This was followed by a period of chinooks, during which time most of the snow went off.

Outside work was limited to the last 10-day period, when a little work was done by a small Government force in connection with refilling river channel below Dodson Dam, placing vitrified pipe culverts on drainage ditches, and pipe turnouts on canals. Also, some work was done in refilling and revetting the canal bed and banks below Rocky Point, mile 8, Dodson South Canal, and at other points on canals. No contract work was in progress.—*Geo. E. Stratton.*

ST. MARY STORAGE.

During December there was about two weeks of exceptionally cold weather with considerable snow. The remainder of the month was comparatively mild.

With the exception of a few days' work the first of the month, clearing drift material from Sherburne Lakes Reservoir, the field force was confined to a camp man and a corral man, one located at Sherburne Lakes Reservoir and one at St. Mary Crossing.

Office work consisted of working up property and stream-flow records and preparing material for the annual project history.—*R. M. Snell.*

SUN RIVER PROJECT, MONTANA.

During the first half of December the weather was very cold and the ground covered with snow, making it impossible to do any outside work. Beginning with the 18th chinook winds began to blow and in a few days the snow had disappeared.

In the operating department the crop census on the Fort Shaw and Greenfields divisions was completed. During the latter part of the month good progress was made in repairing the break in Greenfields Main Canal at mile 3. A new gravel pit has been located and three buildings moved from camp 11 to camp 12 to take care of the large force of men to be employed on repairs next spring and also the storage of construction materials.

The earthwork contractors on part 2 of the Greenfields Division have suspended operations. The structural contractor has had a small force of men and teams hauling sand and gravel. Work on open drain A has been suspended and a small force engaged in making repairs to the drag line.

During the month the following shipments were made from the three principal stations on this project: Wheat, 17 cars; alfalfa, 13 cars; potatoes, 2 cars.—*Geo. O. Sanford.*

LOWER YELLOWSTONE PROJECT, MONTANA-NORTH DAKOTA.

The first three weeks of December were very unfavorable for any kind of outdoor work. On the 9th the thermometer registered 30° below zero. There was sufficient snow for good sleighing until the last of the month when the weather moderated and nearly all the snow disappeared. The latter part of the month the roads were in good condition for automobiles.

All the contractors have laid up for the winter and no construction work was carried on.

The maintenance organization has reduced to the minimum and the only maintenance work carried on

consisted of cutting brush and willows in the main canal.

The annual crop statistics were being compiled. The price paid for sugar beets will be \$5.85 in place of \$4.85, and the growers are expected to receive another small bonus.

All live stock on the project was in good condition, as there was a surplus of feed. Good profits were being realized by the dairy farmers as butter fat was worth about 50 cent per pound.—*L. H. Mitchell.*

NORTH PLATTE PROJECT, NEBRASKA-WYOMING.

Work on the Sand Point culvert on the Interstate Canal progressed satisfactorily during December. About 120 cubic yards of concrete were placed. Office work was continued on the assembling of data for the annual report and statistical data relative to the financial condition of the settlers. On the Fort Laramie Division the canal was operated to the Lingle power plant and a small force was employed in making roads on the canal banks and riprapping.

On the Interstate Division main canal enlargement was in progress with two Monaghan gasoline drag lines and two P. & H. gasoline drag lines. On the Fort Laramie Division two Bucyrus electric drag lines were employed on canal excavation; one Bucyrus electric and one P. & H. gasoline drag line on drainage work, and one Austin gasoline drag line on the excavation of the Horse Creek siphon trench. Satisfactory foundation conditions were being disclosed at the siphon site as excavation progressed. Miscellaneous structure work by Government forces and contractors was in progress on the Horse Creek lateral system. On the Northport Division on Bucyrus gasoline drag line was employed on drainage work, and an average crew of 50 men was employed on structure work, all of which was expected to be completed by May 1.

The farmers had a large percentage of their potatoes on hand and a large loss will be sustained where cellars were not available and the potatoes were stored in pits in the fields.

The Great Western Sugar Co. on December 23 paid all beet growers \$1 per ton in addition to the \$5 per ton heretofore paid.

The alfalfa hay was mostly sold, the price being in general better than last month and averaging from \$10 to \$12 per ton in the stack.

Approximately 47,000 sheep and 1,700 head of cattle were being fed on the project.—*Andrew Weiss.*

NEWLANDS PROJECT, NEVADA.

Unusually cloudy and wet weather prevailed especially during the last half of December. There was considerable fog, and lack of sunshine prevented roads and ground from drying. Ground was free from frost. No irrigation deliveries were made during December.

The Lahontan power plant was operated from the Truckee Canal throughout the month. Stock water to farms was also furnished from this canal.

Snow on the ground at Summit, Calif., in the high Sierras, reached the depth of 113 inches on December 14, the depth on December 30 being 98 inches. These depths exceed any previous December record.

A foreman with 7 men and 6 head of stock, assisted by 12 regular ditch riders, were employed on general maintenance work removing vegetation and cleaning silt from ditches. Ten timber structures were repaired.

Timbers were framed and hauled to the portal of Truckee Canal Tunnel No. 3 for the timbering of about 400 feet of tunnel to serve as temporary repair.

Good progress was made on drainage construction under the contract with the Truckee Carson Irrigation District. Six drag line excavators were in operation and removed a total of 215,500 cubic yards of material. A total of 52,054 feet b. m. of lumber was used in the installation of 35 structures in new drains. In addition to the above a small Austin drag line excavator removed 5,835 cubic yards of material in cleaning old drains.

Miscellaneous surveys for minor extensions of the lateral system and for placing new lands on the farm unit plats were in progress. Preparation of maps and studies were continued for the determination of areas of lands largely private, being irrigated with no water right.

Several meetings were held by the Reno Chamber of Commerce which were attended by the project manager, Gov. E. D. Boyle, and Governor-elect J. G. Scrugham, for the consideration of matters relating to the proposed storage reservoir in Spanish Springs Valley, near Reno. The project received the indorsement of the Reno organization.

On December 21 the Secretary of the Interior approved the contract with the Canyon Power Co. for the lease of the Lahontan power plant for a 10-year period upon the expiration of their present lease. The execution of this contract will remove a serious obstacle to the construction of the Spanish Springs Reservoir as the power company claimed power rights on the Truckee River below the proposed intake to the new reservoir.

State highway engineers visited the Fallon office to arrange details regarding crossings of Government ditches by new highways on the project.—D. S. Stuver.

CARLSBAD PROJECT, NEW MEXICO.

Maintenance work consisted of minor repairs to canal and lateral headgate structures. There was no demand for irrigation water during December, and the entire flow of the Pecos River, which amounted to 9,920 acre-feet, was stored in McMillan and Avalon Reservoirs. Water which would otherwise spill at Avalon Reservoir, will be turned into the canals on January 1, for a two weeks irrigation for alfalfa and grain crops.

A. C. Cooley, Department of Agriculture, visited the project early in the month and urged, among other things, the increase of live stock on the project.

Weather conditions were favorable for cotton picking and other out-of-doors work. There was no precipitation. Range conditions continued unfavorable for cattle, and several herds were on pasture on project lands. Water users were renting cotton fields for sheep pasturage at the rate of one-half cent per head per day. The sheep consume the cotton bolls, thus destroying the possible presence of the pink bollworm, and incidentally fertilize the cotton lands. With the close of the cotton picking season, labor was becoming plentiful and a portion of the surplus was being consumed by the Atchison, Topeka & Santa Fe Railway Co., which had in its employ from three to five hundred Mexican laborers laying new rails between Lakewood and Carlsbad.

Cotton picking and ginning for the season were practically completed at the end of the month, with 6,775 bales of cotton ginned to that date. The average price received during the season was 26 cents per pound; the maximum price was slightly less than 30 cents per pound. The receipts from lint alone are estimated at \$880,000. The cotton-seed oil mill at Loving paid from \$18 to \$40 per ton for cotton seed; the average price was \$28 per ton. Alfalfa

Crop report, Newlands project, Nevada, 1922.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa.....	29,940	Ton.....	70,850	2 3.21	\$11.00	\$779,350	1 \$51.07
Barley.....	437	Bushel.....	25,000		30.00	750,000	
Cantaloupe.....	336	Crate.....	9,912	22.68	.77	7,632	1 17.46
Corn.....	160	Bushel.....	59,610	177.41	1.00	59,610	1 177.41
Garden and miscellaneous crops.....	641	Bushel.....	3,666	22.91	1.20	4,400	1 27.49
Oats.....	72	Bushel.....	1,875	26.0	.65	47,506	1 73.54
Potatoes.....	870	do.....	148,667	170.0	.60	1,172	1 16.27
Wheat.....	2,410	do.....	50,333	20.88	1.20	89,200	1 102.52
Hay (grain).....	114	Ton.....	118	1.03	11.00	60,400	1 25.06
Alfalfa (seeded, 1922).....	1,163	do.....	131		11.00	1,298	1 11.38
Pasture (wild grass).....	6,402					1,441	1 1.24
Pasture (alfalfa after cutting).....						12,989	2.02
Less duplicated areas.....						34,712	
Acresage in full production ¹	34,870	Total and average.....				1,799,270	1 51.59
Total cropped.....	42,390					1,849,710	43.63
Acresage irrigated without crop.....	2,570						
Total irrigated.....	44,960						
		Areas.	Acres.	Farms.	Per cent of project.		
Acresage used for project.....			160,000				
Total irrigable area farms reported.....			71,220	778	44.51		
Total irrigated area farms reported.....			44,960	778	28.10		
Total cropped area farms reported.....			42,390		26.49		

¹ Crops in full production.

² Fed to dairy cows.

hay sold during the month at approximately \$25 per ton to the grower. Data for the 1922 crop report were in process of compilation at the close of the month.

A. T. Strahorn, soil expert, Department of Agriculture, left the project December 16 for Los Angeles, after completing his report relative to soil survey of lands under the proposed third reservoir.

An Austin No. 4 drag-line excavator was transferred to the Yakima project December 5. The Federal Land Bank, Wichita, Kans., requires that applications for loans on project lands be accompanied by a certificate showing the status of construction charges; the clerical force had prepared up to December 31 certificates covering an area of 5,247 acres of project lands. Collections for the month amounted to \$24,649 for operation and maintenance, \$15,232 for construction, and \$2,951 for penalties and miscellaneous items; total, \$42,832.—*Victor L. Minter.*

RIO GRANDE PROJECT, NEW MEXICO-TEXAS.

Construction work during December consisted principally of construction and reconstruction of canals and laterals, several of the drag-line excavators being from drainage for this purpose.

In the Rincon Valley drainage construction was resumed with the operation of the Monighan 1-T excavator, and toward the end of the month an organization was being formed and preparations made for the installation of checks and turnouts in the old community ditches.

In the Mesilla Valley only two drag-line excavators continue on drainage construction, the Monighan 2-T and a Bucyrus 9- $\frac{1}{2}$ on the Montoya Drain construction. Two Bucyrus 9- $\frac{1}{2}$ excavators, 2 P. & H. 206 drag lines, and 2 Ruth ditching machines continued on canal and lateral reconstruction,

the principal work being the raising and enlarging of sections of the Leasburg East Side canals, the Three Saints Lateral, and the La Union East Lateral.

In the El Paso Valley only one Bucyrus 9- $\frac{1}{2}$ excavator continued on drainage construction while the second Bucyrus 9- $\frac{1}{2}$, Bucyrus 30-B, and P. & H. 206 drag lines and a Ruth ditching machine continued on canal and lateral reconstruction and new construction.

In all divisions the greatest advantage was taken of the periods between irrigation runs for the installation of structures. During the first part of the month water was run for irrigation in the El Paso and Rincon Valleys, and during the last half in the Mesilla Valley. On December 18 the first inflow from the Rio Grande into Elephant Butte Reservoir since July 20, 1922, occurred. The draft on the reservoir during the month, however, was greater than the inflow, and the storage decrease amounted to 20,116 acre-feet. Water was shut off entirely at Elephant Butte Dam on the 30th to remain so until the beginning of the irrigation season of 1923 on February 1, 1923.

Weather continued most favorable for construction work.

The cotton crop was practically all gathered and ginned. There was a very noticeable activity in sales of land and preparation of new land for next year's cotton crop.—*L. M. Lawson.*

NORTH DAKOTA PUMPING PROJECT.

December averaged colder than normal.

Maintenance was limited to the necessary work in the power house mine.

Electrical energy amounting to 118,050 kilowatt-hours was delivered to the city of Williston. This

Preliminary crop report, North Dakota pumping project (Williston Division), 1922.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.	
			Total.	Average (per acre).	Per unit of yield.	Total.
Alfalfa hay.....	552	Ton.....	1,133	2.05	\$12.00	\$13,596.00
Barley.....	72	Bushel.....	2,630	36.53	.50	1,315.00
Clover hay.....	111	Ton.....	205	1.85	12.00	2,460.00
Corn.....	25	Bushel.....	1,180	47.20	.40	472.00
Corn fodder.....	73	Ton.....	374	5.09	8.00	2,992.00
Garden.....	57	Acre.....				10,385.00
Hay, native.....	223	Ton.....	253	1.13	12.00	3,036.00
Hay, millet.....	50	do.....	16	1.60	10.00	810.00
Hay, Sudan grass.....	7	do.....		2.38	12.00	192.00
Oats.....	86	Bushel.....	3,950	46.00	.35	1,382.50
Onions.....	9	do.....	2,100	233.00	.90	1,890.00
Pasture.....	41	Acre.....				3,083.00
Potatoes.....	70	Bushel.....	10,540	151.11	.55	5,797.00
Spelt.....	15	do.....	360	24.00	.50	180.00
Wheat.....	35	do.....	537	15.34	1.00	537.00
Miscellaneous ¹	13	do.....				4,093.00
Less duplicated areas.....	188					
Total cropped.....	1,570	Total and average.....				52,230.00
Young alfalfa.....	30					
Young sweet clover.....	3					
Ground fall-plowed.....	17					
Miscellaneous.....	20					
Less duplicated areas.....	50					
Total irrigated.....	1,590	Total irrigable area farms reported.....		3,753	73	49
		Total irrigated area farms reported.....		1,590	73	20.8
		Under irrigation district contract.....		1,590	73	20.8
		Total cropped area farms reported.....		1,570	73	20.5

¹ Beans, sugar beets, clover seed, small fruits, honey. The honey was produced from alfalfa and sweet clover on project.

was about 2,000 kilowatt-hours less than during the corresponding month of last year but represents an improvement over the early months of this year.

One thousand and eighty tons of coal were mined.—*Wm. S. Arthur.*

BAKER PROJECT, OREGON.

The testing of Thief Valley dam site No. 1 was continued during December by drill with a double-shift crew. Six holes were drilled ranging in depth from 17½ feet to 61 feet on lines A and B. The lowest point of bedrock found thus far is at a depth of 9 feet below low water surface of the river. The rock is extremely hard and tight and is very favorable for the foundation of a dam. Thirteen test pits have been dug along the control line, or line A, of the dam site which shows a depth to solid bedrock on the slopes of about 1 foot. Forty-four test pits have been dug on the bench above the right abutment of the dam site for the examination of material for an earth-fill dam. These pits show the depth of material generally to be very shallow, ranging from 1 to 2 feet, except in a small ravine where it is as much as 12 feet deep.

Four pits have also been dug in the valley floor above the dam site for examination of gravel beds, which show a good grade of gravel underlying about 4 feet of soil. The ground water of the valley is at the elevation of the top of the gravel.

An appraisal has been made of the Thief Valley Reservoir lands by a board authorized for this purpose. The report of the board was submitted to the chief engineer under date of December 26, 1922.

A revision of the estimate of the Baker project has been under way during the month and was practically completed at the end of the month. It is proposed that these data will be taken to the Denver office and there compiled and transmitted by a board of engineers about the middle of January, 1923.—*C. C. Fisher.*

UMATILLA PROJECT, OREGON.

From December 5 to 19 the weather was severe. Ten inches of snow fell and subzero weather was experienced. After the 19th a complete reversal of weather conditions took place. By the 24th the snow had melted and springlike weather prevailed to the end of the month.

At the beginning of the month the Umatilla River was too low to allow operating the Feed Canal. There was a good fall of snow in the mountains during the early part of the month. Chinook winds and warm weather toward the end of the month brought the flow of the Umatilla River to normal flood stage. This was immediately taken advantage of for storage. At the end of the month the Feed Canal was carrying close to a capacity head.

Farming operations were practically confined to looking after stock.

On the West Division a small crew was employed cleaning canals and repairing buildings and structures. On the East Division some cleaning was done on the Feed Canal; the usual operating force was employed part of the month running water for storage.

Work on the improvement of the A Canal was continued with a reduced force until the 4th when low temperatures caused a suspension of construction. With warmer weather work was resumed on the 26th with a small crew and continued to the end of the

month; 75 cubic yards of concrete lining were placed and one timber bridge was built.

On account of the severe weather conditions which prevailed during the early part of the month the hay market was stimulated and shipments were being made. The supply of cars for shipments out was good. The Northeastern Oregon Oil Exploration Co. erected their derrick with a view to prospecting for oil near Hermiston. The post office has been moved to a new building, which was needed to handle increased business.—*H. M. Schilling.*

KLAMATH PROJECT, OREGON-CALIFORNIA.

During December the total snowfall amounted to 33 inches. The ground was not frozen so that most of the moisture was being absorbed. This condition promised well for next year's crops, particularly for the dry farmer.

Sheep and cattle in large numbers were being fed on the project farms. The farmers were getting about \$10 per ton for their hay. From present indications the hay crop will be entirely disposed of.

In the Tule Lake Division the four drag line machines were engaged all month in constructing the J lateral system. Good progress was being made on this work. The contractor for the canal structures had his work in good shape and can easily complete it before the next irrigation season.

In the Langell Valley Division the contractors on the construction of the West Canal suspended operations. On the diversion dam the crew had been reduced to about 35 men. The principal work done on the dam consisted of getting rock for riprap and placing 70 cubic yards of concrete and 1,100 cubic yards of puddled backfill.

No water for irrigation was run in any of the project canals. The diversion canal was operated all month, diverting water from Lost River to the Klamath River.—*Herbert D. Newall.*

BELLE FOURCHE PROJECT, SOUTH DAKOTA.

December proved to be a real winter month with more than a week of below zero weather and a minimum temperature of -31°. Less than 1 inch of moisture fell but all was in the form of snow. Freezing and thawing kept the roads in bad condition until the latter part of the month.

Monthly men were engaged in miscellaneous work, such as drilling holes in the parapet wall of the Belle Fourche Dam, repair to equipment, and office work in compiling crop and stock census data.

Project stock appeared to be in fairly good condition, but on account of the severe weather it was necessary to feed rather heavily.

The market for hay was dull although some was moving at about \$5 to \$6 in stack and \$12 baled f. o. b. cars. Wheat was 95 cents per bushel and oats \$1.25 per hundredweight, both of which should be 50 per cent higher to show a profit. The same holds good with reference to hogs and cattle, which were selling at about 5½ cents locally.

Petitions for the organization of the project into an irrigation district were filed with the county commissioners on December 22, 1922, and the hearing was set for January 26, 1923. The vote will probably take place about March 10. There was some opposition to the organization of a district but it is believed that most of the water users are convinced that it will serve their interests better than any other form of organization and a very large majority of the best

business men on the project have signed the petition.—*B. E. Hayden.*

STRAWBERRY VALLEY PROJECT, UTAH.

December temperatures were about normal, while the precipitation was considerably above the average. Intermittent storms prevented any farming operations, except the feeding of live stock.

Prices of wheat and hay advanced slightly during the month, but market conditions were unsatisfactory. The sugar beet factories at Springville and Spanish Fork were shut down about the 12th, after manufacturing 250,000 bags of sugar. A bonus of 75 cents per ton on all beets delivered to December 1 was sent by the Utah-Idaho Sugar Co. on December 20 to the beet growers under the project.

A meeting of representatives from the various divisions of the project was held at Spanish Fork on December 11 at the direction of the Strawberry Water Users' Association, at which active steps were taken to secure deferment of construction charges on the project for several years or to secure, through congressional action, a revision of the reclamation extension act making construction repayments over a period of 40 instead of 20 years.

Utah Lake has reached a new high level for this time of year and, with prospects of an abundant runoff in the spring, a new high level in the surface of the lake is looked for by June 1, 1923.

The project power plant was in continuous operation delivering 111,738 kilowatt-hours to the several project towns, for which revenues amounting to \$2,136 were received. Construction of a 2,300 volt distribution system connection with Payson City lines was begun by the Spring Lake Electric Co., and by the end of the month 60 per cent of the line had been completed. Inspection and testing of poles on the Payson-Salem line was made and it was found that about 25 per cent of the poles on this line will have to be stubbed.—*W. L. Whittemore.*

OKANOGAN PROJECT, WASHINGTON.

December weather was not favorable for outside work but gave promise of a fair amount of water for the next year. The greater part of the month was extremely cold with temperatures falling as low as -19° at Omak and -16° at Conconully and with a snowfall of $9\frac{1}{2}$ inches at Omak and 19 inches at Conconully, the precipitation amounting to 1.42 inches and 1.6 inches, respectively.

Work was begun on additions and tabulations for the annual project history and operation and maintenance report. The field work for the crop report was completed and office work started. The master mechanic and helper were busy with repairs to project automobiles and trucks and in preparing the 200 horsepower type Y semi-Diesel engine for shipment to A. McMillan of Chicago. Two additional employees were reemployed from furlough to assist in the moving and preparation of this engine for loading.

The car shortage continued throughout the month but cars were still being received in about the same number. The apple shipments are from a month to six weeks behind where they should be. This delayed shipping of the early varieties of apples has caused some deterioration and a consequent lowering in the price received by the growers.—*Calvin Casteel.*

YAKIMA PROJECT, WASHINGTON.

December was unusually cold, with precipitation above normal.

The pipe plant was laid out and orders placed for materials and supplies for the manufacture of 33-inch reinforced lock-joint pipe for the Granger Irrigation District; work was started on the building of sand and gravel bunkers.

Sunnyside Division.—On account of unfavorable weather conditions from December 4 to 22, only routine work could be done in connection with maintenance, such as grubbing of willows and repairs to buildings and fences. During the remainder of the month satisfactory progress was made on gravel lining, repairs to wooden structures and berm plowing, and repair of telephone line. The work of overhauling the pumping machinery at the Outlook, Snipes Mountain, Grandview, and Prosser pumping plants was also in progress.

Tieton Division.—Maintenance work included minor repairs to delivery structures, cutting and grubbing of willows on main and sublaterals, repair of telephone lines and buildings. Betterment work on the sublateral system consisted of installation of about 3,000 linear feet of 8-inch and 10-inch wood-stave pipe to replace small wooden flumes, and four concrete head walls and steel gates on turnouts from Lateral G to replace wooden structures.—*J. L. Lytel.*

TIETON DAM.

December weather, consisting of snow, extreme cold, and rain, seriously hampered construction work. Automobile truck hauling between Naches and Rimrock was discontinued, and team hauling substituted. An average force of 400 men was employed.

The downstream dump was brought to elevation 2835 with a top width of about 20 feet. The upstream dump was at elevation 2845, with a top width of 25 to 30 feet. With the embankment at this elevation, the diversion tunnel will pass a flood of 10,000 second-feet, which is as large as any flood of record at this point.

Coyote holes were shot on the upper and lower ends of the spillway. In the former about 20,000 cubic yards of solid rock were moved with 11.4 tons of T. N. T., and in the latter about 25,000 cubic yards of solid rock and very compact earth and boulders were moved with 5 tons of T. N. T. Very satisfactory results were secured with both shots.

Reservoir clearing has consisted of cutting and piling timber and brush.—*F. T. Crowe.*

RIVERTON PROJECT, WYOMING.

Weather conditions were more favorable for construction than is usual for December. The flow of Wind River was about normal. The supply of common labor was fully equal to the demand, and the force employed was materially increased.

On the Wind River Diversion Dam drag lines 121474 and 121322 excavated 1,800 cubic yards of gravel and 120 cubic yards of sandstone for the weir, collected and screened gravel for concrete, diverted Wind River from its temporary channel through the sluiceway, and cleaned the snow and ice from the temporary channel. Concrete was placed throughout the month; 2,071 cubic yards of plain concrete were placed in the weir and 413 cubic yards of reinforced concrete in the fore apron.—*H. D. Comstock.*

SHOSHONE PROJECT, WYOMING.

December weather conditions from the 4th to the 20th were very severe. During the remainder of the month moderate temperatures prevailed and it was possible to continue construction operations.

The placing of concrete in the foundation of the dam was begun on December 1 and suspended from December 4 to December 20 because of extreme cold

weather. During the month 2,058 cubic yards of concrete were placed in 14 shifts. The drilling of drain holes was completed for that portion of the dam

Advance crop report, Garland division, Shoshone project, Wyoming.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average (per acre).	Per unit of yield.	Total.	Per acre.
Alfalfa hay.....	15,784	Tons.....	27,432	1.74	\$10.00	\$274,320	\$17.39
Alfalfa seed.....	73	Bushels.....	0	0	13.00	0	0
Apples.....	18	Pounds.....	19,500	1,057	.02	390	21.14
Barley.....	245	Bushels.....	7,397	30.20	.50	3,699	15.10
Beans.....	37	do.....	492	13.39	3.60	1,772	48.20
Beets, sugar.....	947	Tons.....	10,720	11.32	6.50	69,680	73.58
Cabbage.....	12	do.....	120	10.00	10.00	1,200	100.00
Clover hay.....	107	do.....	60	.56	8.00	1,480	4.48
Clover seed.....	214	Bushels.....	431	2.01	3.60	1,552	7.24
Corn, Indian.....	74	do.....	2,024	27.71	.40	810	11.08
Corn fodder.....	32	Tons.....	81	2.57	10.00	810	25.70
Garden.....	185	Acres.....				15,190	82.00
Hay, miscellaneous.....	78	Tons.....	41	.53	8.00	328	4.23
Millet seed.....	10	Bushels.....	142	14.90	3.60	512	53.67
Oats.....	1,525	do.....	36,277	23.79	.50	18,139	11.90
Onions.....	1	do.....	752	167.15	1.80	1,355	301.88
Pasture.....	2,488	Acres.....				22,055	8.88
Potatoes.....	3,726	Bushels.....	547,448	146.89	.25	136,862	36.72
Wheat.....	6,840	do.....	147,647	21.58	.78	115,166	16.84
Total cropped.....	32,400	Total and average.....				664,320	20.50
Nonbearing orchards.....	13						
Young alfalfa.....	104						
Ground, fall-plowed.....	205						
Miscellaneous.....	153						
Less duplicated areas.....	657						
Total irrigated.....	32,720						
		Areas.....	Acres.....	Farms.....	Per cent of project.		
		Total irrigable area farms reported.....	40,765	640			
		Total irrigated area farms reported.....	32,720	510			
		Under water right applications.....	32,174	631			
		Under rental contracts.....	106	1			
		Water right in litigation.....	440	6			
		Total cropped area farms reported.....	32,400	541			

Advance crop report, Frannie division, Shoshone project, Wyoming, 1922.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay.....	4,374	Ton.....	7,285	1.66	\$10.00	\$72,850	\$16.66
Alfalfa seed.....	145	Bushel.....	39	.27	13.00	507	3.50
Barley.....	128	do.....	2,103	16.50	.50	1,052	8.25
Beets, sugar.....	66	Ton.....	548	8.30	6.50	3,562	53.95
Clover hay.....	371	do.....	201	.54	8.00	1,608	4.33
Clover seed.....	622	Bushel.....	1,191	.96	3.60	2,146	3.45
Corn, Indian.....	29	do.....	613	20.94	.40	245	8.39
Garden.....	62	Acre.....				4,705	76.01
Hay, miscellaneous.....	10	Ton.....	74	.77	8.00	592	6.16
Oats.....	728	Bushel.....	14,512	19.92	.50	7,256	9.96
Pasture.....	1,338	Acre.....				5,542	4.14
Potatoes.....	1,160	Bushel.....	39,091	133.61	.25	9,773	33.41
Wheat.....	1,160	do.....	15,325	13.20	.78	11,953	10.30
Miscellaneous ¹	8					309	38.62
Total cropped.....	9,420	Total and average.....				122,100	12.96
Young alfalfa.....	458						
Ground fall-plowed.....	298						
Miscellaneous.....	318						
Less duplicated areas.....	434						
Total irrigated.....	10,060						
		Areas.....	Acres.....	Farms.....	Per cent of project.		
		Total irrigable area farms reported.....	18,863	272			
		Total irrigated area farms reported.....	10,060	272			
		Under water-right applications.....	9,987	269			
		Under rental contracts.....	73	3			
		Total cropped area farms reported.....	9,420	272			

¹ Beans, cane, corn fodder, millet seed.

foundation which has been excavated. Excavation and trimming of the tunnel connecting the dam and open cut was completed. The class 14 drag line finished stripping the gravel pit, excavating 4,500 cubic yards and rehandling 2,990 cubic yards. During the remainder of the month this drag line was engaged on the excavation of the Willwood Canal, removing 940 cubic yards of class 1 and 4,740 yards of class 3 material.

Drainage work on the Garland and Frannie Divisions was continued with 4 drag lines operating only a portion of the month. Frost conditions made it impossible to continue. The first machine was shut down December 6 and the last machine December 28. During the month 1.46 miles of open drains were constructed.

Crops.—Shipments from the project during the month were as follows: Baled hay, 121 cars; alfalfa meal, 16; wheat, 8; potatoes, 10. The alfalfa mill at Powell was in operation part of the month, grinding 320 tons of hay. Prices for hay were as follows: Delivered at mill (loose), \$11 per ton; baled, f. o. b., \$13.50 per ton.

Maintenance work was confined largely to inspection of drains and structures. Siphons were pumped out and leaks repaired on the Deaver water line. The Shoshone power plant was operated continuously throughout the month, generating 185,400 kilowatt hours, of which 83,950 kilowatt hours were delivered to the construction work and 14,800 kilowatt hours to commercial connections.—*J. S. Longwell.*

INDIAN PROJECTS, MONTANA.

BLACKFEET PROJECT.

During December there were about two weeks of exceptionally severe winter weather, the remainder of the month being about normal.

Maintenance work was confined to making minor repairs to one canal drop and one operation maintenance camp. The field force was reduced to one water master and one camp man.—*R. M. Snell.*

FLATHEAD PROJECT.

Weather conditions during the first part of December were severe, with a snowfall of about 12 inches over the entire project and a minimum temperature of 12° below zero. Chinook winds prevailed in the latter part of the month and cleared the valleys of snow.

Labor conditions were good; but little unemployment existed on account of great activity in logging operations on the project.

Work at the Hubbart Dam continued with a reduced force. Stripping of loose and wet material was nearly completed, and excavation of the foundation trench was well advanced across the bottom of the canyon.

Excavation of the Tabor Feed Canal was completed to station 140+60; progress for the month was slow on account of heavy snow and cold weather; hard material was encountered. Total excavation amounted to 13,992 cubic yards of all classes. Clearing was advanced to station 180; 1,000 linear feet of right of way were cleared and stumps shot out. Construction camp was moved in the first part of the month to a point on S-14 Creek at station 197.

All lateral extension work was forced to stop soon after the beginning of the month on account of snow and cold weather. Operation and maintenance camps were closed or placed in charge of caretakers.

Market prices of farm products showed considerable increase during the month and considerable hay was baled and shipped.

The water users of the Post subdivision have begun a move to form an irrigation district, including about 30,000 acres of irrigable land. A meeting was held at Charlo in the afternoon of December 9 and in the Moiese Valley in the evening, with district counsel in attendance, at which meetings the sentiment was in favor of taking immediate steps to form the district.—*C. J. Moody.*

Summary of employees for December, 1922.

Projects and offices.	Beginning of month.	End of month.	Increase.	Decrease.
Washington office.....	77	77		
Denver office.....	57	58	1	
Field legal.....	17	17		
Examiners of accounts.....	2	2		
Yuma.....	154	155	1	
Yuma auxiliary.....	22	32	10	
Orland.....	72	75	3	
Grand Valley.....	66	91	25	
Uncompahgre.....	88	90		28
Boise.....	103	62		41
King Hill.....	291	269		22
Minidoka.....	81	53		28
Huntley.....	14	13		1
Lower Yellowstone.....	17	15		2
Milk River.....	58	36		22
St. Mary storage (includes half time of 7 on Blackfeet).	11	9		2
Sun River.....	50	47		3
North Platte.....	348	354	6	
Newlands.....	105	107	2	
Carlsbad.....	13	13		
Rio Grande.....	453	530	77	
North Dakota pumping.....	24	24		
Baker.....	28	17		11
Klamath.....	123	105		18
Umatilla.....	70	30		40
Belle Fourche.....	13	10		3
Strawberry Valley.....	18	17		1
Okanogan.....	8	10	2	
Yakima.....	217	127		90
Tieton Dam.....	456	337		119
Riverton.....	103	144	41	
Shoshone.....	261	240		21
Secondary.....	79	64		15
Unassigned per diem.....	26	26		
INDIAN.				
Flathead.....	144	98		46
Fort Peck.....	5	6	1	
Blackfeet (exclusive of half time of 7-6 on St. Mary).....	3	2		1
Total.....	3,677	3,332		
Increase.....			169	
Decrease.....				514
Net decrease.....				345

¹ Exclusive of 3 in Denver office.

FORT PECK PROJECT.

Very low temperatures were recorded during the first 20 days of December. About 9 inches of snow fell during this period which covered the open range and necessitated the feeding of live stock generally.

No field work was in progress. Office work consisted of the preparation of economic reports as to project conditions and compilation and classification of project data and results for the year 1922.

Considerable grain was hauled to the elevators during the month, this being about the only crop that had not been marketed. Prices were somewhat better a high mark of \$1.08 being reached during the later part of the month.

Live stock suffered quite generally during the cold weather and will have to be fed during the remainder of the winter in order to prevent excessive losses.—
E. L. Decker.

GENERAL OFFICES.

Washington office.—Director Davis returned from an extensive field trip on December 11, after an absence of nearly five months. He was immediately called to appear before various congressional committees, including the annual hearing on the budget, one on the bill for an investigation of the Columbia Basin project, and one on Senator Nicholson's bill for postponement of project repayments. On December 22 he gave a talk to the Washington office force on his trip, with particular reference to the Colorado River investigations.

During the absence of the director the office was in charge of Assistant Director Morris Bien as acting director.

Chief Counsel Hamele was in the office the entire month, and on December 5 gave a talk to the force on the meeting in Santa Fe of the Colorado River Com-

mission. Mr. Hamele acted as special legal adviser to Secretary Hoover, chairman of the commission, at the conference.

Purchases during the month amounted to \$5,461.95, and the value of requisitions filled and sales from the storehouse to \$1,868.48. During the calendar year, 1,450 purchases were made, amounting to \$61,566.42; 107 advertisements were issued; and 753 field advertisements were referred to the General Supply Committee. Requisitions and sales filled from the storehouse numbered 2,997 to the amount of \$80,111.34.

Publications issued during the month comprised 293 copies of the annual reports and 537 miscellaneous publications. During the calendar year, 10,128 publications were issued.

The 26 mimeograph jobs during the month amounted to a total run of 13,770 sheets. During the year, the 305 jobs amounted to a total run of 175,375 sheets.

The number of inquiries concerning the service and opportunities for settlement answered by the settlement and information section amounted to 419 for the month and 5,782 for the year. At the end of the

Comparison between operation and maintenance estimates and results. January 1 to December 31, 1922.

Project.	Gross cost.			Net accruals and revenues.			Area for which water was available.
	Total estimate, 1922.	Actual cost, 1922.	Amount * over or under.	Total estimate, 1922.	Actual returns, 1922.	Amount more or * less than estimate.	
UNDER PUBLIC NOTICE.							Acres.
Belle Fourche.....	\$70,000	\$57,900	\$12,100	\$101,153	\$101,720	\$567	82,500
Boise.....	290,000	245,000	45,000	290,000	306,000	16,000	167,300
Carlsbad.....	52,000	56,000	* 4,000	56,625	53,859	* 2,766	25,000
Huntlev.....	45,000	40,900	4,100	46,500	46,584	84	30,000
King Hill.....	35,500	29,800	5,700	1 35,500	1 29,800	* 5,700	16,900
Klamath.....	55,000	43,000	12,000	1 55,000	1 43,000	* 12,000	51,000
Lower Yellowstone.....	36,000	32,500	3,500	1 36,000	1 32,500	* 3,500	40,000
Minidoka (south side).....	94,000	80,000	14,000	95,300	101,200	5,900	49,000
Newlands.....	105,000	113,600	* 8,600	121,000	123,420	2,420	72,200
North Dakota pumping.....	35,000	29,600	5,400	1 30,120	1 30,120		7,650
North Platte (interstate).....	165,000	158,500	6,500	166,700	186,000	19,300	* 130,000
Okanogan.....	37,000	* 42,840	* 5,840	1 53,720	1 53,720		8,460
Orland.....	35,000	35,400	* 400	35,230	35,900	670	20,500
Rio Grande.....	231,000	212,000	19,000	1 233,945	1 214,945	* 19,000	116,000
Shoshone.....	70,000	60,000	10,000	75,750	75,700	* 50	71,100
Strawberry Valley.....	* 25,000	25,900	* 900	* 52,500	56,310	3,810	59,100
Sun River (Fort Shaw).....	14,000	14,500	* 500	15,600	14,400	* 1,200	13,900
Umatilla.....	37,280	36,000	1,280	1 37,280	1 36,000	* 1,280	24,400
Yakima:							
Sunnyside.....	130,000	137,000	* 7,000	148,776	152,000	3,224	103,000
Tieton.....	84,000	85,600	* 1,600	89,800	91,164	1,364	32,000
Yuma.....	260,000	268,000	* 8,000	262,000	264,000	2,000	63,200
Total.....	1,905,780	1,804,040	101,740	2,038,499	2,048,342	9,843	1,183,410
UNDER WATER RENTAL.							
Grand Valley.....	50,000	45,500	4,500	50,800	48,500	* 2,300	38,400
Milk River (including St. Mary).....	71,500	58,500	13,000	22,000	20,956	* 1,044	* 74,000
North Platte (Fort Laramie).....	70,000	67,300	2,700	53,000	65,407	12,407	43,400
Sun River (Greenfields and Big Coulee).....	25,000	24,900	100	30,000	16,800	* 13,200	28,500
Uncompahgre.....	135,000	142,200	* 7,200	142,500	142,150	* 350	100,000
Total.....	351,500	338,400	13,100	298,300	293,813	* 4,487	284,300
INDIAN.							
Blackfeet.....	30,000	19,300	10,700	19,700	9,618	* 10,082	21,500
Flathead.....	65,000	46,300	18,700	58,000	37,796	* 20,204	105,000
Fort Peck.....	14,600	13,600	1,000	1,000	611	* 389	22,400
Total.....	109,600	79,200	30,400	78,700	48,025	* 30,675	148,900

¹ Returns regulated by district contract.

² Includes 17,000 acres for which water is carried in main canal.

³ Not including cost amounting to \$10,360 paid by district for emergency pumping.

⁴ Not including tunnel repairs.

⁵ Includes installment of \$25,000 for tunnel repairs.

⁶ Stored water is furnished through the St. Mary Canal for 21,600 acres additional.

month the total number of inquiries from ex-service men concerning opportunities on the land totaled 195,548.

The photographic laboratory turned out work during the month to the value of \$182.35. The value of this work for the year amounted to \$3,626.82, distributed as follows: Washington office, \$1,406.02; field, \$1,675.90; sales, \$544.90.

Denver office.—The chief engineer was in the field at the beginning of December. During the month he visited the Newlands, Yuma, and Rio Grande projects. From Flagstaff, Ariz., in company with Consulting Engineers A. J. Wiley and L. C. Hill and Geologist R. L. Ransome, he took a trip to the Glenn Canyon and Lee Ferry dam sites on the Colorado River. From Flagstaff the same board proceeded to Las Vegas, Nev., where matters pertaining to Black and Boulder Canyon dam sites were considered. The chief engineer returned to Denver on December 22. Engineer James Munn and Designing Engineer J. L. Savage left on December 1 for Santo Domingo, expecting to return in about six weeks.

The principal work accomplished in the designing section during the month consisted of the following: Prepared preliminary designs and estimates for 7 different types of dams for Thief Valley Reservoir at site No. 1; completed estimates and designs for 2 railway bridges over an arm of the proposed Thief Valley Reservoir, and prepared estimates and preliminary designs for 7 siphons on the North and South Canal, Baker project; made studies and prepared drawings showing proposed revision of drainage holes in Black Canyon Diversion Dam, Boise project; prepared soil maps of the Casper-Alcova project for Mr. Strahorn and soil maps of proposed extension, Carlsbad project, to accompany Mr. Strahorn's report; prepared detail designs for Orchard Mesa flume and hand-railings, trash racks and cast-iron pipe turbine inlets for Orchard Mesa siphon, Grand Valley project; also designs for machinery for turbine operation of wastewater gates for Orchard Mesa siphon; prepared a series of general maps and diagram, large profile drawing of ground water in connection with drainage investigations, and completed preliminary designs and estimates for diversion dams and storage dams for use in Mr. F. F. Smith's report on Lower Platte investigations; prepared detail designs for automatic wasteways, Vandalia Canal, stations 1728 and 1681, Milk River project; prepared detail designs for check S Canal, station 194+87, Newlands project; prepared detail designs for culvert, Fort Laramie Main Canal, station 39+68, North Platte project; prepared new preliminary design for multiple arch dam for Mill Site Reservoir, using new topography submitted by the project manager of Orland; made studies for a new type of overflow check gate for proposed checks, Wyoming Canal, and prepared detail designs for highway bridges at stations 297 and 397, Wyoming Canal, Riverton project; prepared designs and estimates for making repairs to the Spanish Fork Diversion Dam, Strawberry Valley project; some study was given to the plan for alternative outlet works for McKay Dam, Umatilla project; prepared detail designs for special joint sealing forms for 24-inch lock joint pipe, Yuma Auxiliary project; and made extensive studies to determine the proper basis for design of canal checks for the standardization of our canal structures.

The principal work accomplished in the electrical section consisted of the following: Detail drawings of oil tank, drip pan, etc., for the sluice gate installation at the Black Canyon Dam, Boise project, were

prepared and traced. Bids for direct pumping units, specifications 410, were opened December 6 and carefully studied. After conferences with Mr. Borchard, a representative of The Worthington Pump & Machinery Co., the low bidder, recommendation was made to Washington that the bid of the Worthington company be accepted. An engineer from this office spent six days on the Boise project and at Black Canyon Dam assisting in correcting the difficulty with high voltage delivered by the Idaho Power Co. and in various other matters connected with the construction plant. Specifications and drawings were prepared and issued for a new pump to be mounted on the old turbine at No. 2 direct pumping plant and guide bearings and thrust bearings were designed for Nos. 1 and 2 direct pumps, King Hill project. Specifications for hydraulic and electrical apparatus for the proposed Pilot Butte power plant, Riverton project, were revised to provide for the purchase of either one or two units. Mr. Day of the electrical department visited the Salt River project at the request of Mr. Cragin, general superintendent, to pass on the designs of radial gates. Requisitions were prepared for materials for electrifying one class 14 and one class 9½ drag lines on the Shoshone project, and one class 9½ drag line on the Sun River project, and a similar machine to be transferred from the Riverton to the Sun River project. Preliminary designs and estimates for new trash racks and gate hoists for the Spanish Forks diversion dam, Strawberry Valley project, were prepared. Wiring diagram, piping diagram, and general arrangement of auxiliaries for the electrification of the valley drainage plant, Yuma auxiliary project, were drawn and traced.

The more important matters considered by the legal section were: Inclusion of additional lands within Okanogan Irrigation District and the transfer of water right from land without to land within Okanogan Irrigation District, Okanogan project; assignment of water rights from State of Wyoming to the United States, Riverton project; furnishing water for Grindstone Indian Reservation, Orland project; formation of proposed irrigation districts on Flathead project; payment of charges by irrigation district, Lower Yellowstone project; and the request of Gering Irrigation District, North Platte project, that the United States construct a branch drain for the use of the district. The more important forms of contracts considered, prepared, or transmitted were: Supplemental contract with city of Casper, Wyo., and Midwest Refining Co. for release of additional water from the Pathfinder Reservoir; proposed contract with Langell Valley Irrigation District for construction of Horsefly Reservoir; proposed contract with Black Canyon Irrigation District, Boise project; proposed contract for sale of surplus water from Black River, Carlsbad project; supplemental contract with Horsefly Irrigation District for sale of additional water from Clear Lake Reservoir, Klamath project, and contract with Wyoming Highway Commission for cooperation in construction of highway bridge across Wind River Diversion Dam, Riverton project.

An average of 386 letters were received per day in the mails and files section; the disbursing section handled 994 vouchers, involving an expenditure of \$190,260.52; and in the purchasing section 365 advertisements were issued; 561 vouchers were prepared, involving a net expenditure of \$103,212.89, and 2,500 rates were furnished for basing purposes in the purchase and transfer of equipment and materials.

ADMINISTRATIVE ORGANIZATION.

DEPARTMENT OF THE INTERIOR.

Hon. ALBERT B. FALL, Secretary of the Interior.
 EDWARD C. FINNEY, First Assistant Secretary.
 FRANCIS M. GOODWIN, Assistant Secretary.
 EDWIN S. BOOTH, Solicitor for the Interior Department.
 CHARLES V. SAFFORD, Administrative Assistant to the Secretary.
 MORGAN R. BROCK, Assistant to the Secretary.
 HARRY G. CLUNN, Private Secretary to the Secretary.
 JOHN HARVEY, Chief Clerk and Superintendent of Buildings.

U. S. RECLAMATION SERVICE.

WASHINGTON, D. C.

Arthur Powell Davis, director; Morris Bien, assistant director; Ottomar Hamels, chief counsel; J. B. Beadle, director's assistant; C. J. Blanchard, statistician; Hugh A. Brown, editor and office assistant; C. A. Bissell, engineer; J. M. Luney, chief accountant; C. A. Lyman, repayment accounting; Miss H. A. Fellows and Raymond Depue, fiscal agents; C. H. Fitch, chief clerk; Emmet Carr, purchasing agent; G. W. Numbers, appointment clerk; H. N. Bickel, Yakima, Wash., and W. F. Kubach, Denver, Colo., examiners of accounts.

DENVER, COLO.

F. E. Weymouth, chief engineer, Wilda Building, Denver, Colo.; R. F. Walter and C. P. Williams, assistant chief engineers; Miss L. H. Meisel, secretary to the chief engineer; J. M. Gaylord, electrical engineer; J. L. Savage, designing engineer; James Munn, engineer; W. A. Meyer, chief clerk; A. McD. Brooks, purchasing agent; Harry Caden, fiscal agent.

FIELD LEGAL OFFICES.

Boise, Idaho.—B. E. Stoutemyer, district counsel. Projects: Boise, Minidoka, King Hill, and Jackson Lake Enlargement.

Denver, Colo.—Law section office of chief engineer: R. M. Patrick and Armand Offutt, district counsel.

Las Cruces, N. Mex.—Mark B. Thompson, attorney. Projects: Rio Grande, Carlsbad, and Hondo.

Helena, Mont.—E. E. Roddis, district counsel, Helena, Mont. Projects: Blackfeet, Flathead, Fort Peck, Huntley, Milk River, St. Mary Storage, Sun River, North Dakota Pumping, Lower Yellowstone, and Shoshone.

Mitchell, Nebr.—J. N. Beardslee, district counsel. Projects: North Platte, Belle Fourche, and Riverton.

Montrose, Colo.—J. R. Alexander, district counsel. Projects: Grand Valley, Uncompahgre, and Strawberry Valley.

Portland, Oreg.—H. L. Holgate and D. G. Tyree, district counsel. Projects: Yakima, Okanogan, Umatilla, Klamath, and Baker.

San Francisco, Calif.—P. W. Dent and Brooks Fullerton, district counsel, 349 Pacific Building. Projects: Salt River, Yuma, Orland, and Newlands.

PROJECT ORGANIZATION.

Belle Fourche Project.—B. E. Hayden, project manager, Newell, S. Dak.; R. C. Walber, chief clerk.

Boise Project.—J. B. Bond, project manager, Boise, Idaho; Walter Ward, engineer in charge construction Black Canyon Dam; E. R. Mills, chief clerk; C. F. Weinkauff, fiscal agent.

Carlsbad Project.—L. E. Foster, project manager, Carlsbad, N. Mex.; V. L. Minter, chief clerk and fiscal agent.

Grand Valley Project.—S. O. Harper, project manager, Grand Junction, Colo.; W. J. Chiesman, chief clerk; A. H. Hall, fiscal agent.

Huntley Project.—A. R. McGinness, project manager, Ballantine, Mont.; G. H. Bolt, chief clerk; Miss M. C. Simek, fiscal agent.

King Hill Project.—A. M. Rawn, project manager, King Hill, Idaho; T. W. Hause, chief clerk; W. S. Gillogly, fiscal agent.

Klamath Project.—H. D. Newell, project manager, Klamath Falls, Oreg.; N. G. Wheeler, chief clerk; G. R. Barnhart, fiscal agent.

Lower Yellowstone Project.—L. H. Mitchell, project manager, Savage, Mont.; C. A. Denman, chief clerk.

Milk River Project.—G. E. Stratton, project manager, Malta, Mont.; H. A. Parker, engineer; E. E. Chabot, chief clerk; G. S. Moore, fiscal agent.

Minidoka Project.—Barry Dibble, project manager, Burley, Idaho; Dana Templin, engineer; E. C. Diehl, chief clerk; Miss A. J. Larson, fiscal agent; F. A. Banks, engineer, American Falls, Idaho.

Newlands Project.—J. F. Richardson, project manager, Fallon, Nev.; A. W. Walker, engineer; G. B. Snow, chief clerk; Miss Ethel M. Simmonds, fiscal agent.

North Dakota Pumping Project.—W. S. Arthur, project manager and chief clerk, Williston, N. Dak.; H. C. Melaas, fiscal agent.

North Platte Project.—Andrew Weiss, project manager, Mitchell, Nebr.; H. W. Bashore, engineer, Fort Laramie Division; J. R. Ummel, chief clerk; Mrs. A. L. Truax, fiscal agent.

Okanogan Project.—Calvin Casteel, project manager, Okanogan, Wash.; W. D. Funk, chief clerk and fiscal agent.

Orland Project.—R. C. E. Weber, project manager, Orland, Calif.; E. T. Eriksen, engineer; C. H. Lillingston, chief clerk and fiscal agent.

Rio Grande Project.—L. M. Lawson, project manager, El Paso, Tex.; T. W. Parry, irrigation manager; C. A. Peavey, chief clerk; L. S. Kennicott, fiscal agent.

Riverton Project.—H. D. Comstock, project manager, Riverton, Wyo.; R. M. Conner, engineer; G. H. Murphy, chief clerk; W. J. Fogarty, fiscal agent.

St. Mary Storage Division.—R. M. Snell, project manager, Brown- ing, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Salt River Project.—Being operated by the Salt River Valley Water Users' Association; C. C. Cragin, general superintendent and chief engineer, Phoenix, Ariz.

Shoshone Project.—J. S. Longwell, project manager, Powell, Wyo.; J. R. Iakisch, engineer; C. M. Jump, superintendent of irrigation; W. F. Sha, chief clerk; Miss L. C. Drinkwater, fiscal agent.

Strawberry Valley Project.—W. L. Whittemore, project manager, Provo, Utah; J. E. Overlade, chief clerk and fiscal agent.

Sun River Project.—G. O. Sanford, project manager, Great Falls, Mont.; H. W. Johnson, chief clerk; G. A. Benjamin, irrigation manager, Fairfield, Mont.

Umatilla Project.—H. M. Schilling, project manager, Hermiston, Oreg.; G. C. Patterson, chief clerk and fiscal agent.

Uncompahgre Project.—L. J. Foster, project manager, Montrose, Colo.; R. B. Smith, chief clerk; F. D. Helm, fiscal agent.

Yakima Project.—J. L. Lytel, project manager, Yakima, Wash.; R. K. Cunningham, chief clerk; J. C. Gawler, fiscal agent; M. D. Scroggs, superintendent of irrigation, Sunnyside, Wash.; J. S. Moore, superintendent of irrigation, Route 6, Yakima, Wash.; F. T. Crowe, engineer in charge construction Tieton Dam, Rimrock, Wash.; W. C. Christopher and C. F. Gleason, engineers; V. G. Evans, chief clerk; C. B. Funk, fiscal agent.

Yuma Project.—P. J. Preston, project manager, Yuma, Ariz.; R. M. Priest, superintendent of construction; D. C. McConaughy, engineer, Yuma Mesa Division; E. R. Scheppelmann, chief clerk; E. M. Philibaum, fiscal agent.

INDIAN PROJECTS.

Blackfeet Project.—R. M. Snell, project manager, Browning, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Flathead Project.—C. J. Moody, project manager, St. Ignatius, Mont.; S. A. Kerr, engineer in charge construction Hubbard Dam; J. M. Swan, chief clerk; J. P. Siebenicher, fiscal agent.

Fort Peck Project.—E. L. Decker, acting project manager, Poplar, Mont.; Henry Berryhill, chief clerk and fiscal agent.

The Reclamation Record

Issued Monthly by the RECLAMATION SERVICE, DEPARTMENT OF THE INTERIOR, Washington, D. C.

VOLUME 14, No. 2

Price: 75 cents per year

FEBRUARY, 1923



HON. HUBERT WORK, Incoming Secretary of the Interior.

HON. HUBERT WORK, INCOMING SECRETARY OF THE INTERIOR.

The new Secretary of the Interior comes to his duties with large experience in executive affairs, as he has served as First Assistant Postmaster and later as Postmaster General; his vision thus comprehends the whole United States. He has also served in national organizations, having been president of the American Medico-Psychological Association, and a lieutenant colonel in the Medical Corps of the United States Army. He was born in Pennsylvania on July 3, 1860; was a student at the State Normal School, a graduate of the University of Michigan in 1884, and received the degree of doctor of medicine from the University of Pennsylvania in 1885. He began the practice of medicine at Greeley, Colo., in that year and later removed to Pueblo, Colo. He has always taken an interest in politics, and was a delegate at large of the Republican National Convention in 1908.

The new Secretary of the Interior is the eighth in succession since the passage of the reclamation act on June 17, 1902. At that time, Ethan Allen Hitchcock was Secretary, having been selected by President McKinley and retained by President Roosevelt until 1907. The second Secretary to have charge of the administration of the law was James R. Garfield, who continued until the Taft administration, being succeeded by Richard A. Ballinger, who remained for two years, followed by Walter L. Fisher. President Wilson appointed Franklin K. Lane, who was followed by John Barton Payne. President Harding persuaded Senator Albert B. Fall to leave the Senate and appoint the Secretary of the Interior on March 4, 1921.

The administration of the reclamation law is peculiarly tied up with the office of the Secretary, as the law is so drawn as to be administered by him directly. For this reason a change in this office has more immediate effect on the activities of the Reclamation Service than in many of the older bureaus.

THE FOURTH CONFERENCE ON AGRICULTURAL DEVELOPMENT ON RECLAMATION PROJECTS.

By A. C. Cooley, Agriculturist in Charge of the Office of Demonstrations on
Reclamation Projects.

THE fourth conference on agricultural development on Reclamation Service projects was held at Washington, D. C., January 15-20.

The conference was attended by the field men of the offices of Western Irrigation Agriculture and Demonstrations on Reclamation Projects, Department of Agriculture, and several representatives from the Reclamation Service, including the project managers from the Newlands project, Nevada; the North Platte project, Nebraska-Wyoming; and the Minidoka project, Idaho.

The purpose of the conference was to consider ways and means of carrying on the work authorized by Congress, "to conduct investigations in connection with the utilization of lands reclaimed under the reclamation act" and "to encourage and aid in the agricultural development of the Federal reclamation projects."

In a brief review of the discussions of the conference it is not possible to do more than point out a few of the important things that were considered.

The conference opened with a short statement by Dr. W. A. Taylor, Chief of the Bureau of Plant Industry, who called attention to some of the agricultural problems confronting farmers and especially those far removed from our large consuming centers. He said in part:

We feel, I think, that some of the problems of the irrigation farmer are perhaps not more acute than those of the humid land or the dry farmer; but we do feel that there undoubtedly is now a time come upon us when the question as to types of crops to be grown and the way to handle them is going to be stressed upon our distant irrigated areas harder than ever before. If, as seems true, it is going to cost continuously more money to transport those products, it would seem fairly clear that we shall have to concentrate production and reduce whatever charges we have for freight. This feature is not restricted, of course, to irrigation agriculture. It is almost equally true with respect to the heavy and bulky crops everywhere. Every potato grower who has a railroad which he must use knows that. It has, however, become much more evident in the case of the products of irrigation agriculture, and I refer to the fruit in the fruit districts as well as to the annual crops that can be more readily readjusted, for that is apparently a thing that must be faced now for some time, and more definitely than in the past.

The question is as to whether our agriculture must, to a considerable extent, be relocated as to the places of production of things that are heavy and of low price per pound. Such relocation is in fact under way to some extent. It is bound to occur, if this last year's experiences are repeated. The whole tendency at present is to stimulate production of certain of

these perishables within horse or gasoline haul of the consumer. Potatoes, for example, are merely one of the crops we have in mind.

Each member of the conference reported on conditions on the projects with which he was familiar. These reports included statements regarding the success being achieved by farmers in making homes on the land and the systems of farming which in general are proving successful and those which in general are not successful. They pointed out the crop and livestock industries proving best suited to the different projects, the outstanding agricultural and economic problems, and also the present potential relationships between the agriculture on the projects and the agriculture of the surrounding country.

The discussion of the various reports clearly brought out that the present agricultural depression was being felt very keenly by project farmers, a large proportion of whom are heavily involved and are finding it hard to meet their obligations, this condition being due largely to a period of high prices and easy money during and following the war. Until the end of this period, project farmers on the whole had been very successful in their farming operations and in establishing homes.

The high prices paid for certain crops, such as potatoes, beets, and alfalfa, caused farmers to dispose of their live stock and specialize on some one crop. This rush from diversified farming into specialized farming completely unbalanced the agriculture of the projects and all but ruined the live-stock industries and farmers as well.

The problem of declining yields and a lack of a stabilized agriculture was emphasized by all the field men. Mr. Holden, superintendent of the Scottsbluff Experiment Station on the North Platte project, brought out the importance of a carefully planned crop rotation in increasing and maintaining yields.

In our irrigated rotation experiments at the Scottsbluff experiment farm, which have now been under way 11 years, we have 35 different cropping systems. These crop rotations might well be divided into two classes, poor rotations and good rotations. The poor rotations are short and are those in which neither alfalfa or sweet clover is grown or manure applied; the good rotations are longer and include either alfalfa or sweet clover or the application of manure. Manure and the residual effect of alfalfa and sweet clover are very beneficial in maintaining and increasing the productiveness of our light soil. This is well illustrated in the yields obtained in 1922 from these different rotations. The average yield of potatoes

grown on plats never having alfalfa or sweet clover or receiving manure was 154 bushels, of those grown on manured plats the yield was 257 bushels, and of those following alfalfa the yield was 304 bushels per acre. The yield of sugar beets per acre was 10.8 tons from the check plats where alfalfa or sweet clover was never grown nor manure applied; 19.5 tons from manured plats; 19.4 tons from the alfalfa plats the second and third years after the alfalfa was plowed up; 20 tons for a sweet clover pastured plat. Corn from the check plats averaged 27.8 bushels and from the alfalfa plats 79.8 bushels per acre. On the check plats oats averaged 45 bushels, on the manured plats 77 bushels, and on the alfalfa plats 78 bushels. Wheat yielded 13 bushels on the check plats and 28 bushels per acre from the alfalfa plats.

The length of the rotation affects the quality of the potatoes. When grown in short rotations they become so scabby that they are unmarketable. When grown in four-year or longer rotations the potatoes are fairly free from scab.

By using the average yields for the past six-year average from these plats and prices based on pre-war times and under regular farm conditions, the returns from these different plats in terms of dollars and cents show the advantages of high yields. Potatoes show both the greatest loss and the highest profit. The continuous cropped potato plat shows an average yearly loss of \$38.40 per acre, whereas the potatoes following alfalfa give a net profit of \$70 per acre. Sugar beets vary from no profit on the poor plats to \$40 per acre profit from the alfalfa and manured plats. Corn shows a small loss on the poor plats and between \$15 and \$20 profit from the alfalfa land. Small grain seldom shows a profit on irrigated land and should not be grown except when seeded with alfalfa or sweet clover. Barley is perhaps the best grain crop to grow.

If the results from our rotations are figured on the basis of an 80-acre farm, it will still give a clearer idea of the value of a good rotation. If a farmer should follow a continuous potato-cropping system, similar to our continuous potato plat, he would lose each year \$2,980 from his farming operations. A two-year rotation of potatoes and corn shows a loss of \$1,140. A three-year rotation of potatoes, oats, and beets gives a loss of \$820, whereas the same three-year rotation when grown with three years of alfalfa making a six-year rotation shows a profit of more than \$1,300. In a two-year rotation of potatoes and beets the loss amounts to \$810, but when these same two crops are grown in a four-year rotation with alfalfa the profit amounts to \$1,665 after figuring a loss of \$4.50 per acre on the alfalfa. The highest-paying rotation is a seven-year rotation in which alfalfa is seeded with grain followed by three years of alfalfa, one year of potatoes, and two years of sugar beets with the last year of beets receiving manure. This cropping system shows a profit of \$1,775 per 80-acre farm.

On the subject of declining yields, Mr. Noble, superintendent of the United States experiment farm on the Yuma project, states:

The declining yields on the Yuma have become very noticeable. Our three important crops, cotton, alfalfa, and grain sorghum, show a very marked decrease in yield over a period of years. All other problems seem to revert to that one of production. On our high-priced land we find it absolutely necessary to increase

our yields. I think the people on the Yuma right now are ready to look favorably upon any program or plan of a crop rotation which will help solve their production problems.

Mr. Ireland, agriculturist on the Uncompahgre project, stressed the need of greater stability in farming.

It has always seemed to me, he said, that the one big thing needed on most of the reclamation projects from the agricultural standpoint is greater stability. I can see no reason for a farmer expecting to be successful when he is continually changing from one thing to another. One would not expect a doctor to be prosperous who one year followed medicine, then dentistry the next, and something else the next. I do not see that the farmer is much different. No one can be efficient and change his plans from one year to another. By adopting some one carefully thought-out system and staying with it over a period of years one increases his chances for success. It is true, results might come slowly but they will come more surely. He may miss the peak prices, but he would also miss the slumps which are so disastrous. A man develops efficiency and skill as he plays the game; this enables him to reduce his costs. He learns his soils, his crops, and his markets which gives him an advantage over the man who is always changing. So I say that the big thing is the problem of stabilizing our industries for the sake of production and marketing.

In reporting on the systems of farming in use on the successful farms and those in use on the poor farms, it was noticeable that in general the successful farmers were following a diversified system in which some of the live-stock industries were conspicuous. This point was emphasized by Mr. Montgomery, agriculturist for the Minidoka project, who stated:

The type of farming best suited to our project seems to be a general diversified system in which live stock is prominent. In every instance where there has been a swing away from that program there has been a period of disaster. So it seems reasonable to believe that diversified farming is the safe and sane thing. The safe thing for the Minidoka project seems to be in using a third of the land for alfalfa, probably an eighth for potatoes, an eighth for beets, an eighth or less in corn for dairy stock or for cattle and pigs, and the balance in grain. A recent survey of between 170 and 180 farms substantiates the wisdom of this program. We find that the men in the least hard circumstances now are those who have a plan of diversified farming. I should say our best chances for agricultural salvation are with the cow, the pig, and the hen.

The live-stock industries and their importance to the prosperity of the projects received more attention than any other subject under discussion during the conference. It was clear to those present that owing to the location of the projects with their long haul to market and high freight rate, crop disposal would always be a big problem with the farmers located on them. For this reason, it was pointed out that if farming as an enterprise was to succeed on most of the reclamation projects it must be through the utiliz-

ing of live stock to convert the bulky products into a more concentrated form that would stand the expense of the long haul to market.

The importance of live stock in bringing prosperity to a project was well illustrated in a statement by Mr. Cline, agriculturist for the Newlands project, who said:

I find from listening to the other representatives here that conditions on the Newlands project are not as bad as they seem. One thing that is responsible for our favorable condition is that we have been devoting our attention for some time to live-stock farming.

Dairying is our big industry, and everybody admits that it has been responsible for most of our income for the last three years. I think it is bringing in to project farmers something like \$25,000 a month in actual cash. This has helped greatly under the present depressed conditions. A \$30 or \$40 cream check being received every month by several hundred farmers creates a very healthy atmosphere in a community. We have something like 3,500 producing cows on the project. Our December cow-testing association report showed 810 cows with an average production of 26 pounds of butter fat per cow. The average price of butter fat for December was 50 cents, so if you are interested in seeing what this means to a project you can do a little calculating for yourselves.

Along with dairying go our hogs and poultry which are also important industries. Last year there were 12,000 turkeys grown on the project for which our growers received a price of 30 to 45 cents per pound dressed. One woman by her own efforts raised 800 turkeys. These all brought around 40 cents. Many of our new homesteaders are making good from the very start because they have used good judgment in getting some cows and chickens. This provides them with a living and helps them meet some of their other obligations as well.

Mr. Richardson, project manager for the Newlands project, said he desired to emphasize Mr. Cline's remarks by saying:

I am proud to be from the Newlands project. It does my soul good to say it. You know the Newlands project has been looked upon for so long as such a desolate, God-forsaken country that now when some degree of prosperity is coming to it you can't help but want to talk about it. In the past when other communities have felt prosperity we have not. I believe that time has passed, however, and by following the agricultural leadership of the representatives of the Department of Agriculture, we are going to come out all right. I say this because I feel that the work of Mr. Cline with live stock and of Mr. Headley with crops and alkali has been largely responsible for our present healthy condition. Personally, I am convinced that the dairy cow along with hogs and poultry is the road to our success.

The discussion of the agricultural problems centered mostly around the control of plant and animal diseases and pests. Grasshoppers were especially bad on several of the projects. Blackhead in turkeys, tuberculosis in chickens and dairy stock, and cholera in hogs also caused some losses. The alkali problem was discussed and the fact brought out that on sev-

eral of the projects it was becoming a big factor in limiting production.

The economic problems discussed were largely connected with transportation and markets, the solution for which, according to Mr. Scofield, chief of the office of western irrigation agriculture, will be largely in a readjustment of our agriculture to meet present conditions. He said:

There has been a tendency throughout pretty much the whole period of our agricultural development to attempt to learn what crops do best under any set of local conditions. When we have found the crop that does best we have sought to increase its production far beyond local needs, depending upon our transportation system to distribute the product.

In the past there has been a rapid development of transportation. The service has been nearly always adequate and relatively cheap. It could be depended upon to move the products of one community to another at small cost. As long as this condition existed it was often good agricultural practice as well as sound economics to specialize on a few crops even on isolated irrigation projects.

With the new conditions that have obtained since the war we have to take into account a much higher scale of transportation costs and in many cases a less satisfactory service. This condition makes it necessary to give more thought to the possibilities of crop diversification, particularly on these isolated reclamation projects. Not only must we give thought to crop diversification but also to the possibilities of utilizing the bulky crops locally and shipping out only the more concentrated products such as meat and dairy and poultry products. We must give thought also to the problem of supplying local needs as far as possible with local products in order to reduce the cost of transportation on such products from other sections. It is altogether probable that we are never again to have railroad rates on the old basis. Nor is it likely that we shall have again soon the same railroad facilities, relative to the transportation demand, that we enjoyed during the first decade of this century. We must accommodate ourselves to a little greater stress in the matter of moving things from one place to another.

Another phase of the conference in which there was much interest was the discussion on the present potential relationships between the agriculture on the project and the agriculture of the surrounding country. On this subject Mr. Scofield expressed the new point of view developed in the conference. He said:

The economic justification of some of these reclamation projects appears to lie quite as much in their relationships to the agriculture of the country or district in which they are located, as it does to their contribution to the country as a whole; in fact, more so. We may consider in some of the cases that an irrigation project is in the heart of a grazing country, or of a dry-farming country, a place to which retreat may be made in case of widespread disastrous conditions on the range, or upon the dry farms. The opportunities for utilizing the fairly certain number of products of the agriculture of these irrigation projects in those districts might be held to justify economically the expenditure made in the development of those districts and leave out of account any other additions that might accrue.

SHORT STORIES OF SUCCESSFUL SETTLERS.

By C. J. Blanchard, Statistician, U. S. R. S.

THE Rio Grande project, which we visited for a brief time early last month, welcomed us with our first touch of spring. Farmers were plowing their fields, buds were bursting from the branches, and the glorious sunshine tempered the snap in the air. Earth's release from the clutch of winter always occasions our wonder and delight. Nowhere is it more charming than in this valley of sunshine.

The résumé of the past season's labor and results affords the farmers much satisfaction, especially the cotton growers and those whose operations were conducted through cooperative organizations.

At last agriculture is being established on a solid base. There is more scientific and practical farming here to-day than ever before in the history of the project.

For the first time since the Government work began the valley is ready to be shown to home seekers. To-day the newcomer is not required to imagine anything. He can see what these lands can produce under proper tillage. The land seeker who comes to investigate usually buys. Generally speaking, land prices show a deflation from speculative valuations of the past. Sales are made on the basis of actual productivity and not real estate agents' dreams. The settlers are largely farmers who immediately set about to get established.

El Paso has awakened to the potential value of the fertile lands which surround it, and the citizens are organizing to promote a real settlement campaign. A fund of \$150,000 is being raised by them for this purpose. Long-time options on lands which have been appraised by experts will be handled by a committee of citizens, and publicity in the press and by other means will be utilized to acquaint home seekers with the true worth of the lands of the valley.

We shall follow the efforts of the organization with interest and will record the progress in the RECORD in order that experience gained here may benefit other projects where real farmers are needed.

The local press is the barometer of the projects economically and socially. If we read the monthly record rightly, there is promise of fair weather for our farmers. Things are decidedly improved on most of the projects. While spring is always a season of optimism, there is real evidence that the worst is past and the future very much brighter. Of course, we know all is not blooming for the farmers yet, but after the rather protracted period of gloom and de-

spair the present outlook seems rather encouraging. The sore straits of the farmers have awakened the consciousness of the people to the very important position agriculture occupies in the economic affairs of the Nation. We look for a broader extension of credit and a more cooperative and generous spirit in dealing with the farmers than has heretofore been accorded.

We look also for more thrift, industry, and a larger application of gray matter on the part of the farmer in connection with his operations. The top of the long hill down which he slid so swiftly in 1920 and 1921 may not be in sight, but it's not so very far off, anyway. We are in position to Couéize over it if we try. Between this and plowing time it might be profitable to take a look backward and check over mistakes and blunders before planning the season's work. Only fools make the same error twice. One big mistake of our farmers was in failing to make the farm feed the family. The big stack of tin cans in the back yard speaks eloquently of a large grocery bill. The lack of cows, pigs, and chickens reduced incomes and meant a lot of wasted products.

Gathered from the Project Press.

Salt River project, Arizona.—Interesting, isn't it, how an industry will start, take root in a community, and then expand to large dimensions in a surprisingly short period of time? For example, take the poultry industry in the Glendale district. Just a short time ago there were not enough chickens there to call in the coyotes from the hills. To-day Glendale boasts the second largest experimental poultry farm of the Government. It has also the largest packing plant in the Southwest. With shipments of dressed poultry running around a ton and a half a week and steadily growing, it is fair to assume that there is little to worry about among the poultry raisers.

Work has begun on the installation of gates in the spillways of the Roosevelt Dam, which will increase the capacity of the reservoir 300,000 acre-feet. A dam with a capacity of 90,000 acre-feet is to be built at Mormon Flat. A new power house is to be built at Roosevelt Dam, and the combined project will effect an increase in revenue from the power alone of \$450,000 a year. About 8,000 acres additional land will be taken under the project.

Olive growers in the Salt River Valley of Arizona have received an average of \$60 a ton for olives this season. The annual pack is about 125 tons.

Lettuce from the Salt River Valley of Arizona and from the Casa Grande Valley has sold in Chicago, New York, and other eastern markets for \$4 to \$4.50 a crate.

An average of 26 pounds of butter fat was made by the 559 cows in the Maricopa County Cow Testing Association. Fifty cows of the 559 produced more than 40 pounds of butter fat. One cow produced 104.9 pounds of butter fat for the month, the best record thus far made by any cow in the association. More members have come into the association and another tester has been secured.

Orland project, California.—The civic pride of Orland's citizens was evidenced long ago when they began the planting of highway trees. Each year the work goes on, weaklings are cut down, new trees replace them, and gradually the dreams of the people are being realized in the delightful shading of the principal roadways of the town. The country folks are gradually doing their part, and if the same spirit continues, the project will become one of the beauty spots in California.

The Orland spirit might be emulated upon some of our other projects to advantage. Trees make the desert look homelike, they relieve the monotony of flat landscapes, and their beauty is an inspiration. Plant trees. Keep planting them. Get the habit.

Remarkable in these days of dullness in real estate business how people are flocking to the Orland project. As the moth seeks the flame, so do people flock where happiness reigns. Orland folks dwell little on the mistakes of the past or present misfortunes. They are forward lookers, every one of them. Attacking their problems as a community and not individually they conquer, and their optimism and the real progress everywhere in evidence is attracting desirable settlers from far and wide. "The project of no regrets" has no knockers.

Uncompahgre project, Colorado.—Here is a good cow story. W. A. Brower has a grade Holstein cow that has been on test all year. Just before going dry last fall she tested 7.7, which is very high. She recently freshened and one day recently gave 48 pounds of milk which tested 8 per cent, the equivalent of 3.84 pounds of butter fat, which at 40 cents would make over a dollar and a half a day.

At this rate for seven days she would make 33½ pounds of butter and break any and all western slope seven-day butter fat records, even for pure breeds.

It is not unusual for a Holstein cow, when very fat on freshening, for the first few days to have a very high test. The cow was fed alfalfa, silage, and bran.

Minidoka project, Idaho.—"For some reason the story has been broadcast that a large number of the farms on this project would not be handled during the coming planting season. Of course such a statement causes more or less depression, but locally it seems to be absolutely without any foundation in fact," says the RECORD. One of the prominent real estate men reports as high as 10 applications a day from people wanting to rent project farms. Interest on the part of new settlers is growing, and the outlook is bright for a large number of transfers.

During the year 1922 the Rupert creamery purchased 75,400 pounds of butter fat and paid \$27,898 for it. This shows an average of \$2,324.83 per month, or, counting 313 working days to the year, an average of \$89.22 per day. This firm also buys and sells eggs. Their purchases during the past year were 12,480 dozen, for which they paid \$3,619.20, an average of \$301.60 per month and \$11.56 per day.

The figures show that the institution is putting a lot of cash in circulation in the community, and give

more evidence that there is an opportunity here to make the dairy business one of the most important of the county.

Flathead (Indian) project, Montana.—That the dairy industry in the lower Flathead Valley is steadily growing is indicated in the business done by the Polson creamery during 1922, representing an increase of about 10 per cent over the previous year.

During the year just closed \$75,000 was paid out by the creamery company to Flathead farmers for cream. During the year 175,000 pounds of Green Valley and Mission Gold butter were manufactured and shipped to outside markets. Seattle furnished the principal market, with Spokane and Idaho points furnishing a market for a considerable amount.

The average price paid for butter fat during the year was approximately 42 cents.

In addition to the butter, the creamery company handled 20,000 dozen eggs, which were marketed mostly within the State. Farmers were paid a total of about \$5,000 during the year for eggs.

The fact that the local creamery has not reached the point where butter can be shipped in carload lots somewhat limits the market. If carload shipments could be made, Chicago and other eastern markets could be reached.

The business of the creamery has shown a steady increase from year to year since it was started in 1913, indicating that the dairy industry is gradually becoming an important factor here.

There is every indication of a notable increase in the dairy business in 1923, in the opinion of L. L. Marsh, manager of the creamery.

One of the attractive farms of the Little Bitter Root Valley is that of the Denn's family, who came there two years ago. The Denn's brought a cow and a dozen white Leghorn chickens. To-day they have 8 fine milch cows and 100 chickens. One of the cows produces 20 pounds a milking and pays him \$31 per month. The pullets are delivering Mrs. Denn 51 eggs daily.

The Hellman seed ranch nearby produced nearly 300 pounds per acre of Cossack and Grimm seed, which finds a ready market at from 40 to 60 cents per pound.

A. B. Inkster and Roy Loder purchased two fine Aberdeen Angus bulls from the Henderson brothers' ranch at Drummond. These bulls are exceptionally good ones and represent a step forward in the Aberdeen Angus Association. Taylor and Inkster, Roy Loder, Leo Mountjoy, and Haye brothers started this association several years ago. They have purchased registered sires and what registered helpers they could afford to buy and have used the sires with their grade herds until they are getting some fine cattle that sell well on the market. This association has a tract of national forest on the Little Thompson on which nothing but registered Angus sires are allowed. These men are build'ng for better days in the Little Bitter Root Valley.

A representative of a prominent seed company after a canvass of the farmers has signed up 100 acres to be planted in seed peas. We are convinced that the valley is excellently adapted to this crop.

The Polson Midwinter Fair, put on by the South End County Farm Bureau and the Polson Commercial Club, went over big, bigger in fact, than anyone anticipated. The variety and quantity of exhibits and the lively interest displayed by the farmers and townspeople alike proved a surprise even to the promoters

of the enterprise. The displays were really representative of the products of the valley, for nothing was grown especially for display purposes. The fair was planned late last fall after harvest and there was no opportunity to select and save especially good specimens. The products exhibited were indicative of the average quality of crops grown in the valley.

Perhaps no display proved more of a surprise than the corn exhibit. There were 38 entries, a total of about 400 ears. Former corn State farmers, who were particularly interested in the display, agreed that the corn was the real stuff.

The potato display was very complete. There were 26 displays with eight varieties represented. The Netted Gem was the leader. Certified seed potatoes, commercial potatoes, and baking potatoes were shown. The display of spuds would stand competition with any potatogrowing country in the world.

Newlands project, Nevada.—A visit to the Mutual creamery plant in Fallon will at once convince one that this enterprise is forging ahead and making great preparations for the future. Just now the creamery is receiving about 7,800 pounds of cream on Saturdays and Mondays and about 3,500 pounds on other days during the week. They are constantly increasing the volume of cream received and are paying 1 cent above the market quotations.

The farmers of Fernley Valley have formed a company, known as the Fernley Valley Produce Growers' Association (Inc.), for the purpose of handling general farm products.

The farmers of Fernley Valley have signed up with the American Fruit Growers' Association (Inc.) for 160 acres of cantaloupes for the coming season. They will grow the famous Hearts of Gold cantaloupes and expect to plant at least 200 acres when planting season begins this year. At the present time only 160 acres have been signed, but they are pretty sure of at least 200 acres coming in.

Rio Grande project, New Mexico-Texas.—Cantaloupes are coming back in the Mesilla Valley.

Following a slump in production two years ago, resulting from low prices and unfavorable market conditions, the acreage devoted to melons was reduced. The crop last year brought good returns. This has encouraged ranchers to increase the acreage this year.

A total of 1,300 acres have already been assigned to cantaloupes. This is about 400 acres more than the total devoted to the crop last season, and probably will be increased.

It is estimated that more than 500 cars will be shipped out of the valley.

Arrangements were completed at Anthony recently by which a four 70-saw gin and warehouse will be erected near there in time to handle this season's cotton crop.

Deals are pending for two additional gins in Dona Ana County. These plants will also be equipped with warehouses.

It is an undisputed fact that in sections where cotton thrives and produces as it does in the Mesilla Valley cotton culture has promoted the bringing under cultivation of a much greater acreage of unimproved land than any other crop.

David L. Glass, a farmer near Mesilla, reports net profits of \$1,813.88 on 10 acres of cotton in 1922. Here are the figures:

Expenditure.—Labor, \$5; seed, \$21; water, \$20; picking, \$268.09; ginning, \$139.49; total, \$453.58.

Receipts.—Lint cotton, \$1,986.15; cottonseed, \$210.61; bolls, \$70.70; total, \$2,267.46.

The foregoing is an instance where the gin value of the cotton was greater than the original cost of the land.

Umatilla project, Oregon.—The dairy fraternity are rather proud of the record of one of the Bays's Jersey herd, which shows 624.54 pounds of butter fat and 11,363 pounds of milk. The cow, Kitty's St. Mawes, No. 417054, was one of the few genuine living granddaughters of the far-famed sire, Old St. Mawes. With the birth of her son she qualifies for her second medal for production and prepotency.

Mr. Bays and family arrived last fall from Tillamook and brought a choice foundation herd of registered Jerseys with them, as well as some select purebred Barred Rock chickens to stock the ranch they have here.

Okanogan project, Washington.—Coming home from the poultry show at Wenatchee with five ribbons for the 12 birds he had on exhibit makes A. E. Bosworth rather cheerful and convinces him that he has an excellent lot of birds in his Omak pens.

The prizes won were: First and fourth cock, fifth hen, and two special firsts for color and shape. These were all taken by his R. C. R. I. Reds. Special mention is coming to Mr. Bosworth's first prize cock, as he competed against the winner of the recent Seattle and Tacoma shows with the same judge acting at all three exhibitions. In fact, this coast winner had to take fifth place at the Wenatchee show.

Mr. Bosworth says this show has convinced him that the dry sunshiny climate peculiar to this section makes better colored and shaped birds just like it does apples. At any rate, most of the coast prize-winning birds could not hold a candle to the fowls of north central Washington.

Yakima project, Washington.—Diversity has long been the slogan of Yakima Valley farming, and judging by the live-stock census of the Sunnyside project, which has just been completed, the slogan has been heeded.

The average Yakima Valley farm, judging by the 3,183 holdings which comprise the Sunnyside project, has a trifle less than 1 auto, has 2 horses, 3 cows, 2 sheep, 4 hogs, a flock of 69 hens, and something over 1 hive of bees. There are none of the Harlem pets, goats, and only 18 mules on the whole project in spite of the experience at "mule skinning" which many of the Yakima Valley youths had during their World War experience. With such an average live-stock showing and with the valley's great production of crops, it would appear that Yakima could stand isolation from the rest of the world.

The live-stock and automobile census for the 3,183 farms, comprising 80,761 cropped acres, shows:

Autos	2,718
Horses	7,283
Mules	218
Cattle	12,261
Sheep	5,842
Hogs	12,302
Fowls	222,039
Bees (hives)	3,997

It is not strange that there are no cr pe hangers in Yakima. There's a reason. Read the figures above.

PROJECT WOMEN AND THEIR INTERESTS.

By Mrs. Louella Littlepage.

Paper Gardens.

THE logical time for planning the planting of home yard or garden is not in June, when one looks enviously at the vine-covered porches and flowering bushes in the neighbor's yard. Neither is it in May, when the press of spring work is great. To-day is not too early to begin making definite plans as to just what you need.

First look over the house and yard as a whole. Approach from both directions and look well at the yard directly from the front. Does it look bare and uncared for? Are there unattractive vistas with bare spots or sheds marring the view? The chances are there is need for some planting to hide porch or house foundation and to break that hard straight line. The combining of two or three shrubs and vines usually suffices at least for a beginning, but let the planting present a variation in height. When nature plants a grove or fills a roadside with sumac she invariably achieves the most artistic effect because there is nothing stilted about her planting.

The cost need not necessarily be great, although the expenditure of a few dollars on shrubs has time and time again added hundreds of dollars to the selling price of a farm. Wild cucumber vines, honey-suckle, or rambler roses on a trellis will make a good filling for a corner. Dwarf evergreens form a good background around porch foundations, and in front of these nothing is more attractive than spirea and bridal wreath.

Once we knew a wise mother who had overheard her children half enviously commenting upon the home of a city cousin. Immediately she began a campaign to win the affection of the children for their farm home, and one cold January night she took them into a delightful partnership. On the long dining-room table they deposited paper, pencils, seed catalogues, paint boxes, and scissors, and forthwith began their paper gardens which were to blossom into reality in the spring.

With a square of manila paper each child marked out his own conception of dooryard and vegetable garden. Each selected the varieties he was willing to care for. For instance, Kate wanted a triangular bed of yellow flowers, and every yellow flower found by any of the group was handed over to Kate. There were nasturtiums, marigolds, California poppies, calliopsis, etc., and she was anxious to grow the family lettuce. George wanted to plant bulbs and corn, and Margaret wanted blue flowers and roses. Then they planned a lavender and purple bed for grandma. The

beds were planned so that the tall plants should be in the center or back and the annuals and perennials were kept separate. The beds were marked out and colored and seeds selected and noted.

One evening was spent on vines, one on bulbs, etc. The vegetables took up a whole week, and their color, habits, and even food values were discussed. Ralph grew borders of pansies and petunias along the walks between the vegetable beds, and Jennie planted the onions with alternate rows of poppies.

For variety this mother secured a bird manual with colored illustrations. Before spring the children had drawn and colored and familiarized themselves with the habits of practically all the birds to be found in their section of the country. It wasn't long before their schoolmates began dropping in to join in these games, and all during the long summer following they enthusiastically carried out their plans. Next their rooms were transformed by their own handicraft, and each carried out the color scheme chosen for the garden work. The boys made bird houses and a sun dial, and the girls fashioned porch and hammock cushions and between seasons had garden parties and porch teas.

Paper gardens these days are quite the thing for scientific agriculturists. They have proven as efficient as budgets. It is a great time saver to plant the vegetables in long rows, far enough apart so that they may be cared for by a horse-drawn cultivator.

An attractive farmyard is worth many dollars every season. The man who comes to buy hogs or alfalfa seed or fruit or any other farm product is likely to gauge your wares by the appearance of your home. If it is bare and unpainted, with sagging gate, and rioting weeds, he will hardly take it for granted that your poultry strain is pure or your seed unadulterated by noxious weeds. Make your paper gardens now and it will pay royally both in coin of the realm and in heart's content.

A Valuable Exhibit.

The farmers of the Flathead (Indian) project recently held a home products fair at Polson, which was not only an incentive to better methods but which contained exhibits of striking educational value. Included among these was a unique dairy exhibit, the display planned to boost the consumption of dairy products. The main feature illustrated comparative food values. For instance, it was shown that 1 quart of milk equals in value $\frac{1}{4}$ pound of ham, 2 pounds of apples, 8 eggs, 1.7 pounds of bananas, $\frac{3}{4}$ of a pounds of beefsteak, and to emphasize the comparison plates

containing the indicated amounts of various foods were exhibited. It was shown that 1 pound of butter equals 12.3 pounds of cabbage, 9.2 pounds of oranges 5.9 pounds of chicken, 4 pounds of beefsteak 5.5 pounds of bananas; 1 pound of cheese equals 4.4 pounds of chicken, 4 pounds of bananas, 2 pounds of beefsteak, 20 eggs, 5.6 pounds of apples.

One of the most complete exhibits was in the domestic arts division. The display of needle work of various kinds was remarkable in both quantity and quality. The feature of the display was furnished by Mrs. C. E. Mutchlor, who had 53 pieces of needlework of almost every description. Her display was entered as a group exhibit and she was awarded a purple chappionship ribbon. Mrs. Mutchlor is now 71 years of age, and most of the articles submitted by her have been made since she was 60. A quilt pieced by her in 1842 and quilted in 1846 was included.

Considerable stress was laid on the school work displayed, which showed the fine work being done in the various schools in writing, drawing, designing, etc. A little house made and completely furnished by the Valley View School attracted much attention.

Baked foods and canned vegetables, fruits, and meats were there in abundance.

All this, of course, was in addition to the general farm products exhibit.

Butter.

A recent Department of Agriculture bulletin characterized butter as "a concentrated vital food." According to this authority, butter is all food and no waste. It is a concentrated, highly nourishing food. One pound of butter furnishes as much heat and energy for the body as 41 eggs or 4 pounds of beefsteak, and in addition it contains that vital element absolutely necessary to growth and health. Because butter contains this vital food substance it is an indispensable food. No child can grow and develop without receiving a liberal supply of this vital element, the principal source of which is butter fat. Other food fats do not contain this vital substance, hence there is no substitute for butter. This makes butter more than a fat. It makes butter fat the first and most important item to be considered in the selection of food. The presence of this essential substance for growth and health puts butter and other food containing butter fat in a class by themselves as the one group of absolutely essential foods.

Use butter or cream in every possible way in cooking. By so doing you not only improve their flavor but add tremendously to their food value.

Remember, there is no substitute for butter.

How They Got Hot Lunches.

The teachers in one of the Grand Valley project schools, being anxious for the children to enjoy the advantages of the hot midday meal, early in the school year instituted the serving of one hot dish, as

many of the pupils come from a distance. Their plan was for the domestic science classes in the fifth, sixth, seventh, and eighth grades to take turns in preparing and serving at noon some wholesome soup in sufficient quantities to make a good meal by the addition of bread or crackers to be furnished by the pupils. The menu was varied by a change from one kind to another variety of soup—vegetable, tomato, potato, barley, bean, and other soups being on the list.

So marked was the benefit that the people of the district heartily approved the plan, the school board took over the work and expense of the lunches and arranged to have a woman prepare the soup and bring it steaming hot promptly at noonday. A committee chosen from among the pupils attends to the serving. The pupils line up with bowl and spoon, each receives his portion, and after eating it washes his dishes and puts them away in a locker provided for the purpose. When the work was taken up a charge of 3 cents for each lunch covered the original cost. Now the cost is met by the school board, which is the most satisfactory way.

A Day in the Orient.

The art department of the El Paso Woman's Club, Rio Grande project, discussed the art of oriental rug making at a recent meeting in the club building. Two displays of oriental rugs were on view. These were hung from the balcony, arranged between the windows, draped over tables, and placed on open spaces on the floors. A collection of 24 rare specimens was loaned for the occasion by Mr. Dye, American consul at Juarez, who was formerly in the Consular Service at Smyrna. A number in this collection were rare prayer rugs from various oriental countries. Mr. Dye talked on the history of the different rugs and their makers.

The other exhibit was loaned by Mr. Malooly, a Syrian, who talked interestingly on the 'distinguishing features of rug making among the various oriental countries, giving pointers on how to distinguish the real article from imitations. He also displayed a number of artistic oriental brasses.

Mr. Wade showed lantern slides of eastern scenes, entertaining with personal reminiscences during the display of the slides.

The stage was brilliant with cherry blossoms, pottery, and incense burners. Dramatic oriental readings and Japanese and Indian love songs were rendered, the artists appearing in costume. About 200 people enjoyed the program, after which tea was served as an appropriate ending of a most interesting and profitable afternoon.

Women's Exchange Great Success.

The November issue of the RECORD noted the establishment of the Women's Exchange at Caldwell, Boise

project, Idaho. A report of the meeting of the organization on January 8 would indicate that the venture is an unqualified success. At that date sales amounting to more than \$100 had been made since the opening of the exchange on November 18. A number of positions for women had been obtained and sales made by the use of the bulletin board, which is 4 by 6 feet and always full of "want" and "for sale" ads.

At the meeting it was decided that each organization should take charge of the exchange for one Saturday in turn and arrange to provide and sell cooked food in connection with the fancy-work department. The matron of the rest room has charge during the week, when only fancy work is sold.

Grand Junction Has New Day Nursery.

Members of the Grand Junction (Col.), Woman's Club have opened a day nursery and clinic, after years of planning, and are reported as being as happy as small girls arranging a doll house.

The clinic room will also be used for nutrition classes, and the high-school class which is taking instruction in home nursing will meet there for demonstrations in bed making and other features of the care of the sick. On Saturdays physicians will perform tonsil and adenoid operations here and the patients will be cared for until they are able to be returned to their homes.

A nursery shower brought the project a large number of useful articles, and altogether the new enterprise has a most promising start.

Aids Women in Getting Employment.

A former member of the Boise (Idaho) Business Women's Club, now living in Berkeley, Calif., has written her Boise friends an interesting account of the activities of the employment bureau conducted by the Berkeley Business and Professional Women's Club. They have pledged support to the Women's Employment Bureau, which is carried on in cooperation by a number of organizations.

This bureau plans to serve the business and professional woman in time of need by offering counsel and assistance in securing positions.

Club women have backed almost every worthy project for the advancement and upbuilding of their communities, including charitable and educational measures, but no more appropriate or praiseworthy work has been taken up by them than direct and personal assistance to women.

Plant Trees.

Members of the Neighborhood Club, Hermiston, Umatilla project, Oregon, desiring to improve the park, made arrangements to meet their husbands there one day recently, and 147 trees were planted. At 4 o'clock a delightful chicken dinner was served

and the park board extended a vote of thanks to all who participated in the event.

The Commercial Club of Hermiston, Umatilla project, Oregon, and the Neighborhood Club and Farm Bureau of Columbia District are sponsoring a plan for planting trees on the Diagonal Road, a fine macadam highway which extends from Hermiston past the Columbia School and for some distance farther into the rural section. One section of this road is pretty well planted, but no attention was paid to uniformity. At present the organizations interested are discussing tree varieties, some favoring mulberry trees, which attract insect-destroying birds, and others favoring some variety which requires little irrigation, etc. Whatever is decided on, the beautification of this fine highway will pay big returns.

Good Money.

Mrs. S. J. Comrie, Yakima project, Washington, is demonstrating in a decided manner that there is money in poultry raising. Her income in December, over and above cost of feed and operating, was \$120 from the eggs produced by a flock of 184 White Leghorns. The average production of her flock of pullets has been between 60 and 70 per cent. The bulk of eggs she sells to special customers, receiving top prices.

This is Mrs. Comrie's first attempt at poultry raising. She had no idea of how to handle her birds before going into the business, but adopted and followed faithfully the best methods she found recommended by the Extension Service and Experiment Station. This meant getting up early in the dark and cold to start her artificial lights for the houses. Punctuality in feeding and a scrupulous attention to details is what she claims to be the basis for her success.

Picking Up Pin Money.

To-day successful farmers are giving special heed to pin-money crops, the things that give him ready money at off times, because it takes a long time to grow and harvest and market grain, and it is a long wait for cattle to reach the market age. By this same token it is a wise farm woman who plans some industry to bring in money for her little needs. Quite a famous woman writer recently stated that her idea of luxury was to have plenty of money for the little things.

Think out the needs of your community and of the near-by towns and plan a selling campaign. Look up the waste corners of your land and put in a pin-money crop for next year's needs. One woman lived half way between a little country town and a large flourishing city, and with real business foresight she planned to collect her pin money from both. She planted

flags and peonies, Shasta daisies and lilacs, zinnias, marigolds, phlox, etc. At first she supplied white flowers for cemeteries and weddings, paying especial attention to those with "keeping" qualities. Later she was able to carry out color schemes for various entertainments. She devised a mail-order system of her own for letting clubs, churches, and hotels know her prices and her daily supply. The little town had no florists and the big town liked the fresh flowers she invariably furnished. She collected rich earth mold, sifted and sacked it, and sold it to town people who were having their lawns landscaped or who wanted it to pot winter flowers.

Next she began bottling horseradish. It is the easiest thing in the world to grow, and can be pre-

pared for the table at very small expense. It took but a short time to work up quite a trade, as the home-prepared is much superior to that put up commercially by large packers.

Another woman, profiting by her husband's example in feeding his hay in the farm instead of selling it, decided to double her profit on eggs. So she put up a fine salad dressing which consumed all the eggs except a certain output to special customers who paid extra prices for fresh-laid eggs.

One woman planted pumpkins along a rail fence, made them into jack-o'-lanterns in October, and with practically no outlay in money and none in time except about one week before marketing she made a goodly Christmas fund.—L. L.

THE FEDERATED ASSOCIATION OF U. S. RECLAMATION PROJECT WATER USERS.

THE Federated Association of United States Reclamation Project Water Users was formed as the result of a meeting held at Salt Lake City on January 29-31, 1923. This meeting was called for the purpose of urging upon Congress legislation for extending the time of payments due to the United States on the noninterest-bearing instalments on cost of water from works built by the use of the reclamation fund. The conference was attended by 35 persons, representing 14 projects. These are in the northern part of the arid West, including what are characterized as the hay-producing projects, namely, those in which agriculture has not yet become highly diversified, and the principal acreage is in alfalfa or other forage crops.

Preceding the calling of the conference a plan was submitted from Klamath, Oreg., calling for payment of one-tenth of the charges already delinquent, to be added to the charges current for that year, these delinquent charges to bear 5 per cent interest, the losses to the reclamation fund to be made good by the issuance by the Treasury Department of 4 per cent bonds, so that the work of development might not be retarded.

Preceding the conference this proposition was discussed by the landowners from the Minidoka project, who proposed a modification to the effect that any such relief should be extended on the request of the landowner, provided that he is an actual occupant of the land, and not to a nonresident; also that landowners holding two or more farms should be granted relief for one farm only.

In view of the fact that the repayments for 1922 have exceeded those of the previous years and that the majority of the landowners have already made payments, it was concluded to petition Congress that "It is the sense of this conference that we urge upon Congress the immediate enactment of such legislation as will

provide for the carrying over of all delinquent charges, with the granting of sufficient time to the settlers to meet such charges and continue to carry on their farm operations."

It was also urged that the general expense of the Reclamation Service should be carried by a separate appropriation from the Treasury of the United States. These general expenses for which Congress might appropriate are presumably the general administration costs growing out of correspondence, the preparation and publication of annual reports and other documents, legal and related costs in the preparation and execution of contracts, and other items of this nature.

The conference commended the American Farm Bureau Federation for its efforts on behalf of the landowners on the projects and indorsed its plan for the appointment of a permanent irrigation committee within its membership. The Farm Bureau will undoubtedly be able to assist greatly in the development of a constructive program—one which will be in accord with its helpful attitude toward its members in the way of better cooperation in farming and marketing.

Mr. Lee R. Taylor, of the Strawberry Valley project, Utah, was selected as chairman of an executive committee to consider a constitution and by-laws for the association and to represent the water users in the meantime.

Various similar organizations have been attempted in the past, but their failure to survive has been due largely to the wide difference of conditions prevailing, not only between different projects but on the same project, so that there has not been a common ground for meeting of ideas further than that for securing extension of time on the noninterest-bearing instalments. There is, however, a wide field of opportunity and a need of discussion and diffusion of

information surrounding the larger agricultural and economic conditions on all the projects.

The discussion at Salt Lake City brought out details of the difficult agricultural situation, namely, the high freight rates, difficulty of securing transportation at critical times, heavy taxes, and especially the burden of interest paid to the bankers, mortgage companies, and other creditors at rates of 8 and 10 per cent. It was appreciated that even if the Government should extend the time of repayment, or even give the works away (thus stopping all further construction), still the heaviest burden would remain, since the Government is a minor creditor, and

the amounts paid back to the reclamation fund are among the lesser of the obligations of the landowners.

It also appears that many of the owners are, in effect, land poor; the average acreage held by men applying for relief exceeds that of the ordinary irrigation farmer, and the amounts covered by mortgages, with consequent heavy interest and taxes added, exceeds the productive capacity of the proportion of the land which he is renting or otherwise utilizing. Thus, the really significant side of the present situation is one which undoubtedly the Federal Farm Bureau can take up, aiding far more substantially than in the details of legislation for temporary relief.

THE CAMAS DIVISION, FLATHEAD (INDIAN) PROJECT, MONTANA.

By C. J. Moody, Project Manager, U. S. R. S.

CONSTRUCTION of the Camas Division of the Flathead project for 10,500 acres of irrigable land will be completed in 1923 under the proposed program of work. This division was opened for settlement in 1910, largely in 40-acre farm units. Delays in securing funds for construction and difficulty in delivering water through canals and laterals on account of a peculiar sinkhole formation in the soil prevented the entrymen from having assured water service until the year 1921, although some water was delivered in 1919 and 1920.

The crop report of 1922 shows 2,650 acres irrigated and cropped, of which 915 acres were alfalfa hay and seed and 590 acres in new alfalfa with nurse crop of grain. Maximum acre crop yields reported are as follows: Alfalfa hay, 5 tons; alfalfa seed, 4½ bushels; barley, 50 bushels; beans, 20 bushels; mangels, 40 tons; clover hay, 3 tons; Indian corn, 60 bushels; oats, 67 bushels; potatoes, 344 bushels; wheat, 36 bushels.

The average gross crop value in 1922 was \$24 per acre, an increase of \$10 per acre over that of 1921.

The farmers of this division had their first annual fair at Lonepine on September 16, 1922, and showed a remarkable display of grains, hay, fruits, and vegetables. The fruit display of berries, plums, prunes, grapes, peaches, pears, apples, etc., was an eyeopener to the advancement of the fruit culture of the country. The exhibit of vegetables—squashes, watermelon, cantaloupes, tomatoes, and one exhibit of peanuts—showed that the development of home gardens had reached an advanced stage and that the best quality of vegetables grow in the light clay loam of this division.

The prize-winning exhibits were taken to the county fair and again carried off first honors. The best Guernsey heifer also got away with first honors at the Montana State Fair.

The alfalfa seed growers of this division have organized and are prepared to furnish certified seed from registered fields of either Cossack or Grimm alfalfa. The dairy industry is still in its infancy, but is getting a good start. Guernsey stock from Maine was shipped in last winter.

The Camas Division is handicapped by being about 20 miles from railway shipping points. It is surrounded by large areas of grazing land which furnish pasture for sheep and cattle. Forests of pine, fir, and tamarack cover the mountains that border the valley on the west. Local sawmills furnish lumber for all purposes and ship to outside markets. The farmers have sized up the situation and are going strong on the raising of seed crops for which the land and climate appears well suited. They feed their hay and grain on the farm and market cream, eggs, beef cattle, hogs, and poultry.

The handful of the original entrymen who remained on their land after waiting 10 years for water are beginning to make real the visions they had when they first entered the Little Bitterroot River Valley. Some who left before water was available are returning. Many new farmers are coming in, attracted by low prices of land and by the opportunities offered. With the completion of the Hubbart Reservoir in 1923 and the assurance of a good water supply, it is anticipated that this valley will show a rapid development and greatly increased prosperity.

PRACTICAL HINTS FOR POULTRY FARMERS.

By H. O. Numbers, Secretary, Pennsylvania Poultry Association, Loretto, Pa.

THE greatest need of poultrydom to-day is organization. The rapid development of all other agricultural pursuits is due to cooperation and organization of the farmers. The poultry industry is termed the largest live-stock industry in the world; yet the majority of poultrymen are plodding along, each man for himself. From all the various methods employed, all the different schemes advanced, all the feeds, and represented feeds, stimulants, product accelerators, and other "bunk," the beginner and even the seasoned poultry farmer is compelled to grope around through this jungle of chaos in order to find a system, a method, or a feed that will prove out. We must have fixed rules and methods, and we must have a censor to determine the "wheat from the chaff" in all this conglomerate representation of advertised "poultry needs."

There is only one solution, proper organization under direction of recognized authorities. Right here let me state that in too many States the county agent is at fault for the loose manner in which the poultry industry is conducted. I recently interviewed one county agent, and he admitted that he knew nothing about chickens, therefore he was not sufficiently interested to boost the business. This same agent was working relentlessly organizing "potato growers' associations," "cattle breeders' clubs," "hog raisers' associations," and giving demonstrations of the action of various fertilizers on the soil. This is all very good, we need all this, but poultry culture should not be excluded.

Only a very few States have solved the problem in a practical way, and these are to be commended as pioneers in laying the foundation for one of the coming industries. Briefly follows the plan of organization. In every State a State poultry association, in every county a county association, all in coordination with the State department of agriculture; the State college or university extension force to function in their prescribed manner. County associations will cooperate with the county agents. Now, in order to get the best results, a State poultryman should exist in each and every State where poultry is raised. This man must be a practical man, to function in connection with the State department of agriculture, who would be available upon call to the farmers to assist them in their problems. This office would in no way usurp the good work that college extension men are performing, for their itineraries now render it impossible to get around to the individual farmer and give him the much-needed assistance. They are

overcrowded and can not do the work justice. Their work is more valuable to the farmer in the form of scientific lectures, demonstrations, poultry shows, etc., whereas the practical poultryman would aid in "selling organizations," "problems of vital interest requiring immediate attention"; in fact, he would be a State bureau of poultry information.

My personal experience impels me to advocate a State poultryman for the good it has done for me, and I am but one of many thousands who would benefit by such a plan. Let me illustrate: In the days before Pennsylvania lost her State poultryman I needed assistance on some vital questions. A post card to the State poultryman brought him in very short time. I was advised and counseled in the right way, and I am in the business to-day. I would not be, however, if I had followed my own ideas and had not the proper assistance at the right time. When a man wanted a job he merely advised the State poultryman and if he was worthy he was placed. Employers listed their requirements with the State poultryman, and they were never disappointed with his choice.

Let me ask you of what value is Government assistance to you if you do not try to help yourself? You must have a successful State organization and you must have county associations. You can not overestimate the good you can do. Let me illustrate: In my own State every member of the State association is protected against fraud. If he buys and "gets stung," he reports the facts to the secretary, who takes the matter up. Here is what happens: The fraud is either compelled to return the money or he is prosecuted, or else he is blacklisted and reported to each individual of the organization. If any of the members have stock for sale, they list it with the secretary. When inquiries come in, the secretary knows just who is reliable and makes the necessary reference. We do not have a State poultryman; we do have an unexcelled extension force working out from State College, and I can not laud my praises of these men too highly. It is through these men that Pennsylvania to-day is making history in the poultry world. We have zoned off our State, and a practical poultryman stands ready to give assistance in each zone. The secretary holds these records. The secretary's office now is a bureau of information for poultrymen. When a request to the secretary is received, he notes the location; if extension men are not available, he refers the "needy one" to a practical authority in his zone.

County organizations are invaluable from the standpoint of cooperative sales associations and cooperative buying clubs. It's a fraternity in itself—a case of brother help brother. The first thing to do is to get organized. Get after your county agents, then clamor for State aid, but do something yourself.

Many baby chicks this season will be affected with leg weakness. The cold, damp seasons prevents their getting out on the ground. You can avoid this. I am growing "Easter broilers" that will never see the ground. But they are on a sanded floor, and their diet is carefully arranged. You must grow bone and muscle, feathers, and red corpuscles, as nature decrees, and there is just one way, a balanced ration. If you should have your chicks weaken in the legs, give them lime water, one tablespoon in a pint of water, about three times a week. Plenty of green feed is a necessity. Sprouted oats are the best. Try and get your chicks all hatched this year during March and April.

Now, in closing, get organized. If you are already organized, boom your organization. "In union there is strength." You, individually, will benefit. A commercial institution will "turn down" one man, but it will deliberate a long while before it will "turn down" an organization.

KENJOCKETY RANCH, LONEPINE, MONT.

By W. W. Von Segen, Flathead (Indian) Project, Mont.

[The heading of the paper on which this article was written gives an idea of the progressive spirit of this farmer of the Camas Division who homesteaded land in 1910, waited until 1919 for water to be brought to his land, and who has now built himself a fine home and is secretary of the local water users' association and of the Flathead Seed Growers' Association. The names on the letter heading represent the whole family, his wife, two young sons, and a daughter. The water master of the Camas Division says they are all workers on the farm. It is spirit like this among the farmers that is making the Camas Division the most promising part of the Flathead project.—C. J. Moody, project manager.]

THE Camas Division of the Flathead project, Montana, is proving to be a splendid locality for the raising of alfalfa seed.

From a small beginning of 3,000 pounds two years ago the amount raised in 1922 jumped to 20,000 pounds of high-grade seed, much of which will be registered.

The clay loam soil of the Little Bitter Root Valley produces seed of better quality than the light and more porous soil of the Northwest. The alfalfa is sown either in rows or broadcast and is watered by means of corrugations 20 to 36 inches apart.

Five growers at Lonepine sent exhibits of Grimm and Cossack alfalfa seed to the International Hay

and Grain Show at Chicago in December, and three of them won prizes in world competition. Only three other winners in different parts of the State were recorded, and all save one were classed lower than the Lonepine seed, the exception being only one point above the third man on the list.

An association known as the "Flathead Seed Growers" has been formed to market the seed, and suitable machinery for cleaning has been installed in a centrally located warehouse. A much larger acreage is being planted each year and the coming season promises to break all records.

Poultry Raising on Our Projects.

On many farms of the Reclamation Service the lack of poultry of any kind—good, bad, or indifferent—is conspicuous, despite the desirability of realizing completely the slogan "A flock on every farm."

With a view to stimulating poultry raising in Arizona the extension service of the University of Arizona is planning to send a representative to visit communities at least once a year, and oftener if desired, to furnish practical suggestions for feeding, housing, breeding, hatching, rearing, and culling poultry flocks. Recently the Utah County Poultry Association was organized on the Strawberry Valley project to encourage the poultry business and to find an adequate market for poultry products. Doubtless others of our projects have similar organizations.

In this connection the following is quoted from a recent announcement of the Department of Agriculture:

A new one-reel film, entitled "Making Poultry Pay," designed to present the fundamentals of poultry raising for the small producer, has just been completed for the Bureau of Animal Industry, and is now released for distribution by the United States Department of Agriculture.

This picture stresses the points that the beginner in poultry raising must observe if he is to hope for success. Quality of stock, care in selecting eggs for setting, and in handling the sitting hen or the incubator, ventilation and sanitation in providing quarters for the hens, treatment of diseases, and the kind of rations to feed for egg production are some of the phases of the business covered.

Being popular rather than technical in treatment, "Making Poultry Pay" should be of value for use in communities where poultry constitutes a side line in general farming, rather than where fowls are raised on a commercial scale. The picture may be borrowed for limited periods from the Department of Agriculture, or copies may be bought at the cost of printing.

Poultry raising, at least as a side line, should receive every encouragement on our project farms, and it is suggested that poultry organizations on the projects utilize this service of the Department of Agriculture with a view to increasing the interest of the farmers in this industry.

GEORGE WASHINGTON AS A SURVEYOR.

By Morris Bien, Assistant Director, U. S. R. S.

WASHINGTON'S career as a surveyor covers a period of about three years from 1748, when he was 16 years old, to 1751. During 1749 he was appointed official surveyor of Culpeper County, Va., at a salary of £50 per annum. In 1751 he was appointed adjutant in the military forces of Virginia at a salary of £100 per annum, and remained in the State military service for eight years. The appointment as adjutant and family obligations apparently ended his career as a professional surveyor.

ment for the guests by surveying in their presence gardens, fields, etc., and then in their presence rapidly drawing the plats.

The illustration shows a plat bearing his initials, made February 27, 1747-48, when he was 16 years old. The double date is due to the change of calendar, the year under the old style running to March 25, whereas the second date corresponds to our present series, beginning the year with January 1.

This ability attracted the attention of George William Fairfax, who was one of his close friends, Hon. William Fairfax, and also of Lord Fairfax, whose estate adjoined Mount Vernon, and who owned considerable tracts of lands and were subdividing them.

Lord Fairfax in 1748 engaged Washington to proceed with George W. Fairfax, his agent, to make surveys in the Shenandoah Valley of Virginia which were then needed in connection with his subdivision and sales of lands.

Washington's work was evidently satisfactory, for he was steadily employed by Fairfax as the director of his land office and of his surveys.

The story of a month's trip, March 11 to April 13, in 1747-48 has been published under the title "Washington's Journal, 1747-48," by J. M. Toner, M. D., 1892, Albany, N. Y.

He notes something of the economic character of the country:

We went through most beautiful Groves of Sugar Trees & spent y^e best part of y^e Day in admiring y^e Trees & richness of y^e Land. * * * The land is exceeding Rich & Fertile all y^e way produces abundance of Grain Hemp Tobacco &c.

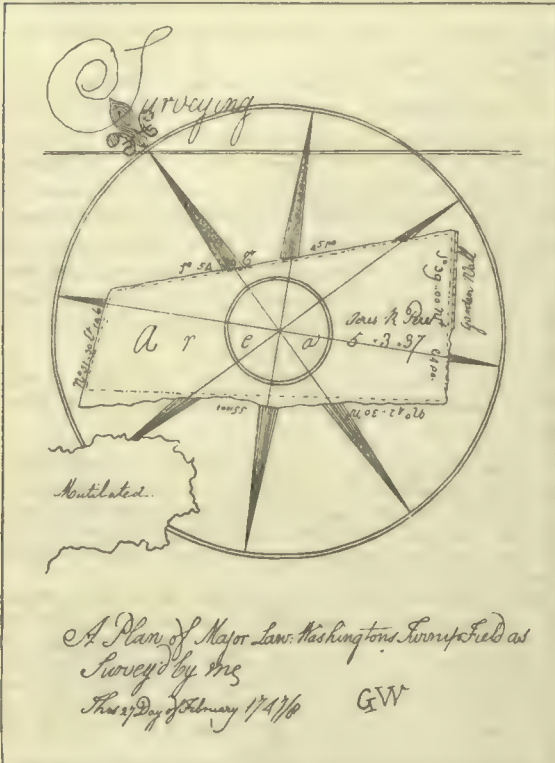
This journal contains many field notes of surveys made for Fairfax and others and usually signed by the surveyor, two chainmen, the marker, and the pilot. Under date of March 15, 1747-48, the journal contains a set of field notes, as follows:

The Manner how to draw up a Return when Survey'd for His Lordship or Any of y^e Family

March y^e 15th 1747-8 Then Survey'd for George Fairfax Esqr. Three Thousand & twenty Three Acres of Land lying in Frederick County on Long Marsh Joining Thomas Johnstones Land & bounded as follows

Beginning at (A) Three Hickorys Corner Trees to Thomas Johnstones Land & Extending thence along his S 13 W¹ One Hundred Seventy two Poles to (B) a Locust Johnstones Corner thence along another of his Lines S 34 E¹ 150 po. to (C) a White Oak another of his Corners thence S⁷⁵ E¹ 186 po & to (D) a large Hickory thence N⁰ E¹ 160 po xing a Spring Run to (E) three Red Oak Fx¹ on a Ridge thence N⁰ 30

¹ Fx probably means, marked "Fx" for Fairfax.
"W:O:Fx" probably means "White Oak marked Fx."



His schooling consisted of attendance in the local country schools of Westmoreland County, Va., and he early showed an aptitude for mathematics. Mr. Williams, principal of the academy, took special interest in his studies, teaching him surveying and navigation. The business of surveying was, of course, important at that time because the large landholders were dividing and selling their lands, which provided considerable work.

While on his frequent visits to Mount Vernon, then owned by his half brother, Lawrence Washington, he found amusement for himself and provided entertain-

E^t 436 po to a Hickory an Red Oak Fx at (F) thence
N° 7 E^t 420 po xing Long Marsh to (H) two Red
Oaks & a W:O:Fx in a Bottom in y^e afores^d Thomas
Johnstones line finally along his line S° 80 E^t one
Hundred fourteen Poles to y^e Beginning Containing
Three Thousand & twenty three Acres.

p^r James Genn

Henry Ashby :
 : Chainmen
Richard Taylor:

Robert Ashby Marker
Wm Lindsey Pilot

N. B. The Distances in y^e above Writing ought to
be Written in Letters not in figures only I have done
it now for Brevity sake

The journal contains a few bearings of "The Courses
of the Town of Alexandria," which appear to be along
the original shore line of the town and were probably
run when the river was frozen.



COMPOSITE PICTURES OF WASHINGTON.

The journal contains memoranda of various kinds, drafts of letters which he might have use for, drafts of letters actually written, memoranda of measurements of clothes, lists of clothes, razor, etc., which he carried on a trip, a poem presumably to the "Lowland Beauty," whose identity has not been accurately determined, and other data.

One note is rather interesting:

M: the regulator of my watch now is 4 M: and over the fifth from the Slow end.

Anyone reading this journal must be impressed by the evidence of methodical habits, painstaking care, and accuracy which would inevitably make a good surveyor.

Copies of his surveys and plats have occasionally been unearthed in the county records and on retracement have been found accurate within the limit of work possible with the instruments used and under the conditions.

The group of pictures of Washington here shown is copied from Science of December 11, 1885, and shows three composite pictures made by photographing on one plate each of the group indicated, thus bringing out in one picture the average of the features of all.

One interesting point in connection with Washington as a surveyor is the laying out of the District of Columbia, which by the Constitution was fixed as an area not exceeding 10 miles square. Of course, we know from spherical geometry that a figure with 4 right angles and 10 miles on a side can not be drawn on the earth's surface. By proclamation of January 24, 1791, Washington provided for a survey of "four lines of experiment" in order to make a tentative location of the tract. After these surveys had been made, his proclamation of March 30, 1791, described the District of Columbia as follows:

Beginning at Jones's Point, being the upper cape of Hunting Creek, in Virginia, and at an angle in the outset of 45 degrees west of the north, and running in a direct line 10 miles for the first line; then beginning again at the same Jones's Point and running another direct line in a right angle with the first across the Potomac 10 miles for the second line; then from the termination of the said first and second lines running two other direct lines of 10 miles each, the one crossing the Eastern Branch aforesaid and the other the Potomac, and meeting each other in a point.

It will be observed that the lines are not to be run around the square as might have been prescribed and which would not have closed, but the two final lines are described as meeting each other in a point which they would not do if described only as 10 miles long. The description in the proclamation is as near a square of 10 miles on the earth's surface as can be laid out.

This proclamation is in the handwriting of Thomas Jefferson, then Secretary of State, as were most of the State papers at that time; but as Washington's

studies doubtless qualified him to make the fine distinction presented by this proclamation, I am disposed to believe that these accurate instructions for the method of survey originated with him.

CAMP AND MESS HOUSE, TIETON DAM.

By V. G. Evans, Chief Clerk, Yakima Storage.

T IETON DAM is located on the Tieton River 20 miles from Naches, Wash., which is the nearest railroad point.

CAMP.

The camp consists of 112 houses for married employees and 12 bunk houses with accommodations for 471 men. All houses are rented on an informal lease signed by the tenant and construction engineer. This lease shows the schedule of charges to be made against the tenant each month for the various accommodations and services rendered, regulates the alterations that may be made in the premises covered by lease, provides against keeping domestic animals such as hogs, cows, etc., within the camp limits, and has the usual cancellation clause. Each lease is numbered and filed, and a house rental card, bearing the same number for cross-reference purposes, is made out showing the name of the lessee and a description of the property covered. This house rental card is ruled to cover all items that are furnished tenant during a 12-month period. Postings are made to this card monthly, and the total is drawn off at the end of each month and given to timekeeper, so deduction may be made on the time book. The house rental card serves the additional purpose of showing at the end of each year the amount that has been collected on each building to reimburse the Government for the cost of erection, and in this way it is possible to arrive at the figures required for the plant inventory and cooperative fire insurance survey.

The unmarried employee arriving on the job reports immediately to the timekeeper, who issues an employment notice card and an identification badge, and instructs the employee in regard to meal hours and the shift on which he will be employed. The employee then takes his employment notice card to the camp man in charge of the blanket room, receives a supply of bedding, and is directed to the bunk house and bunk which he is to occupy. The blanket-room man makes out a card showing the name of the employee and a list of the bedding issued. When an employee leaves the service he is required to get a clearance by turning in all bedding issued to him and having a notation to this effect on his "order for time" card. Clean pillow slips are issued weekly and clean cotton blankets used as sheets are issued twice monthly.

All bunk houses have steam heat, running hot and cold water, electric light, shower bath, and toilet. The charge for individual rooms, including use of bedding and their laundering, is 15 cents per night. The same service is furnished at 5 cents per night in the houses that are not partitioned into individual rooms.

The water supply for the camp is gravity flow diverted from Wildcat Creek at 125-foot elevation above the main camp. This water is tested at regular intervals by the resident physician.

Fire protection is afforded by 42 outside fire hydrants with 2-inch hose connection, and 6 fire houses containing hose carts and emergency tools. Each hose cart carries 500 feet of 2-inch fire hose, and this is supplemented by hose permanently attached to certain hydrants. Hose is so distributed that at least two streams can be turned on any building within the fire limits. A special telephone circuit connects all fire houses with the compressor house, and alarms turned in are sounded by the compressor operator on the fire siren, using a code signal system to indicate the part of camp endangered. Fire houses, alarm system, emergency tools, hydrants, and hose are inspected weekly by the camp superintendent. Necessary repairs and replacements are made immediately.

A covered garbage can is furnished for each residence and numerous trash or dust cans are placed throughout the bunk-house district. Garbage is collected in the residence district weekly and the cans at the bunk houses are emptied at more frequent intervals. Disposal is effected by means of a concrete incinerator erected at some distance from the camp.

Steam heat is furnished mess house, office, hospital, and bunk houses by a central heating plant equipped with two horizontal low-pressure boilers. This plant is operated continuously during the winter months and on a two-shift basis during spring, summer, and fall.

MESS.

The cafeteria system was tried out here, but it was found that this plan was not successful in handling a mixed force of office employees, shopmen, and laborers on heavy construction. A modification of this system is used in the preparation of individual lunches or "nose bags," however, the staple articles being placed in the bag by the pantryman and the employee making his own selection of such items as cheese, boiled eggs, pickles, etc. In this way waste on the part of individuals who do not care for such foodstuffs is eliminated.

A working steward is employed who passes on all questions affecting messhouse operations. He consults frequently with the purchasing agent, so that advantage may be taken of seasonal variations in the price and variety of foodstuffs.

Plant and equipment depreciation and freighting are heavy charges against this mess, and no relief from these costs can be given because of the comparatively short time the camp will be operated and the distance from the nearest railroad point.

The kitchen and bake shop are well supplied with labor-saving devices, such as electric ovens, steam-pressure ovens, steam kettles, bread and cake mixing machinery, paring machine, dish-washing machine, and electric griddles. Every effort has been made to use this machinery to the best advantage in effecting a reduction of labor costs.

The success achieved in economizing on labor can best be measured by a comparison with labor costs for other messes. The labor cost at this mess was 14 per cent of the gross cost of operation during the year 1922, as compared with 20.3 per cent for the average cost of all messes in the service during 1921. Our experience has shown that it requires the services of one messhouse employee for each 20 men fed.

Economy of foodstuffs is effected by carefully estimating quantities required for each meal, preparing appetizing and nutritious dishes of pleasing appearance, and by serving a good variety without the overabundance that has been characteristic of the average construction camp mess during the past few years. In this way the variety and quantity of leftovers to be disposed of has been reduced to a minimum.

A battery of electric hot-cake griddles has been installed at a convenient place between the ranges and the dining room, and toast, hot cakes, eggs, etc., are served direct from these griddles to the tables instead of preparing a large quantity in advance and allowing them to become cold and soggy. These griddles also take the place of steam tables in keeping various foods hot until served.

The meat market is run as a separate reimbursable account. All meats are turned over to the messhouse boned and ready for the ovens. The labor cost of preparing meat is charged against messhouse operations, and a fixed percentage is added to the weight of all fresh meat to cover shrinkage while in storage.

An average of 100 loaves of bread are baked daily in the mess bake shop for sale through the mercantile store.

Plant and equipment depreciation charges are made on a basis of men fed per month instead of on a time basis. In this way we are able to operate on a more uniform unit cost throughout the year.

Three shifts have been employed on construction, and this has made necessary the serving of eight meals per day, beginning with breakfast at 6.30 a. m. and ending with supper at 12.15 a. m. Two shifts are employed in the messhouse to take care of these meals. This mess served 256,326 meals during the year with the following division of cost: Plant and equipment charge, 6 per cent; labor, 14 per cent; foodstuffs, 71 per cent; miscellaneous charges, 9 per cent.

RECLAMATION LAW NOTES.

By Ottamar Hamiele, Chief Counsel, U. S. R. S.

Appropriations for Reclamation Service.

(Extract from) an act making appropriations for the Department of the Interior for the fiscal year ending June 30, 1924, and for other purposes. (Act January 24, 1923, Public No. 395, 42 Stat. —.)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, for the Department of the Interior for the fiscal year ending June 30, 1924, namely:

* * * * *

RECLAMATION SERVICE.

The following sums are appropriated out of the special fund in the Treasury of the United States created by the act of June 17, 1902, and therein designated "the reclamation fund," to be available immediately:

For all expenditures authorized by the act of June 17, 1902 (Thirty-second Statutes, page 388), and acts amendatory thereof or supplementary thereto, known as the reclamation law and all other acts under which expenditures from said fund are authorized, including salaries in the District of Columbia and elsewhere; examination of estimates for appropriations in the field; refunds for overcollections hereafter received on account of water-right charges, rentals, and deposits for other purposes; printing and binding, not exceeding \$30,000; law books, books of reference, periodicals, engineering and statistical publications, including their exchange, not exceeding \$1,500; purchase, maintenance, and operation of horse-drawn or motor-propelled passenger-carrying vehicles; payment of damages caused to the owners of lands or private property of any kind by reason of the operations of the United States, its officers or employees, in the survey, construction, operation, or maintenance of irrigation works, and which may be compromised by agreement between the claimant and the Secretary of the Interior; and payment for official telephone service in the field hereafter incurred in case of official telephones installed in private houses when authorized under regulations established by the Secretary of the Interior:

Salt River project, Arizona: For examination of project and project accounts, \$5,000;

Yuma project, Arizona-California: For operation and maintenance, continuation of construction, and incidental operations, \$430,000;

Orland project, California: For operation and maintenance, continuation of construction, and incidental operations, \$50,000;

Grand Valley project, Colorado, including Orchard Mesa unit: For operation and maintenance, continuation of construction, and incidental operations, \$395,000;

Uncompahgre project, Colorado: For operation and maintenance, continuation of construction, and incidental operations, \$185,000;

Boise project, Idaho: For operation and maintenance, continuation of construction, and incidental operations: *Provided*, That the expenditure for drain-

age shall not exceed the amount paid by the water users pursuant to the provisions of the Boise public notice dated February 15, 1921, except for drainage in irrigation districts formed under State laws and upon the execution of agreements for the repayment to the United States of the costs thereof, \$1,390,000;

King Hill project, Idaho: For operation and maintenance, continuation of construction, and incidental operations, \$35,000;

Minidoka project, Idaho: For operation and maintenance, continuation of construction, and incidental operations, with authority in connection with the construction of American Falls Reservoir, to purchase or condemn and to improve suitable land for a new town site to replace the portion of the town of American Falls which will be flooded by the reservoir, and to provide for the removal of buildings to such new site and to plat and to provide for appraisal of lots in such new town site and to exchange and convey such lots in full or part payment for property to be flooded by the reservoir and to sell for not less than the appraised valuation any lots not used for such exchange, \$665,000;

Huntley project, Montana: For operation and maintenance, continuation of construction, and incidental operations, \$115,000;

Milk River project, Montana: For operation and maintenance, continuation of construction, and incidental operations, \$140,000: *Provided*, That repayment of the construction cost of the project may be made through a division by the Secretary of the Interior of such cost into a primary construction charge and a supplemental construction charge, of approximate equality, the former payable according to section 2 and the latter payable according to section 4 of the extension act of August 13, 1914 (Thirty-eight Statutes at Large, page 686);

Sun River project, Montana: For operation and maintenance, continuation of construction, and incidental operations, \$145,000;

Lower Yellowstone project, Montana-North Dakota: For operation and maintenance, continuation of construction, and incidental operations, \$120,000;

North Platte project, Nebraska-Wyoming: For operation and maintenance, continuation of construction, and incidental operations, \$1,420,000;

Newlands project, Nevada: For operation and maintenance, continuation of construction, and incidental operations, \$735,000;

Carlsbad project, New Mexico: For operation and maintenance, continuation of construction, and incidental operations, \$80,000;

Rio Grande project, New Mexico-Texas: For operation and maintenance, continuation of construction, and incidental operations, \$900,000;

North Dakota pumping project, North Dakota: For operation and maintenance, continuation of construction, and incidental operations, \$100,000;

Baker project, Oregon: For investigation, commencement of construction, and incidental operations, \$500,000;

Umatilla project, Oregon: For operation and maintenance, continuation of construction, and incidental operations, \$900,000;

Klamath project, Oregon-California: For operation and maintenance, continuation of construction, and incidental operations, \$700,000;

Belle Fourche project, South Dakota: For operation and maintenance, continuation of construction, and incidental operations, \$95,000;

Strawberry Valley project, Utah: For operation and maintenance, continuation of construction, and incidental operations, \$45,000;

Okanogan project, Washington: For operation and maintenance, continuation of construction, and incidental operations, \$65,000;

Yakima project, Washington: For operation and maintenance, continuation of construction, and incidental operations, \$1,310,000;

Riverton project, Wyoming: For operation and maintenance, continuation of construction, and incidental operations, \$600,000;

Shoshone project, Wyoming: For operation and maintenance, continuation of construction, and incidental operations, \$925,000;

Secondary projects: For cooperative and miscellaneous investigations, \$100,000;

For the continued investigation of the feasibility of irrigation, water storage, and related problems on the Colorado River, and investigation of water sources of said river, \$100,000;

Under the provisions of this act no greater sum shall be expended nor shall the United States be obligated to expend, during the fiscal year 1924, on any reclamation project appropriated for herein, an amount in excess of the sum herein appropriated therefor, nor shall the whole expenditures or obligations incurred for all of such projects for the fiscal year 1924 exceed the whole amount in the "reclamation fund" for that fiscal year;

Ten per centum of the foregoing amounts shall be available interchangeably for expenditures on the reclamation projects named; but not more than 10 per centum shall be added to the amount appropriated for any one of said projects, except that should existing works or the water supply for lands under cultivation be endangered by floods or other unusual conditions, an amount sufficient to make necessary emergency repairs shall become available for expenditure by further transfer of appropriation from any of said projects upon approval of the Secretary of the Interior;

Whenever, during the fiscal year ending June 30, 1924, the Director of the Reclamation Service shall find that the expenses of travel can be reduced thereby, he may, in lieu of actual traveling expenses, under such regulations as he may prescribe, authorize the payment of not to exceed 3 cents per mile for a motor cycle or 7 cents per mile for an automobile, used for necessary travel on official business.

Total, Reclamation Service, \$12,250,000.

The aggregate of all estimates of appropriations from the "reclamation fund" contained in the Budget for any fiscal year shall be included in the totals of the Budget for that year.

Relief for Injured Reclamation Service Employee.

An act for the relief of William B. Lancaster. (Act Feb. 5, 1923, Private No. 160, 42 Stat. —.)

Be it enacted by the Senate and House of Representatives of the United States of America in Con-

gress assembled, That the Secretary of the Treasury be, and he is hereby, authorized and directed to pay, out of any money in the Treasury not otherwise appropriated, to William B. Lancaster, during his natural life, the sum of \$40 per month, to date from the passage of this act, as compensation for injuries sustained while employed by the Reclamation Service at the west portal, Strawberry Tunnel, Strawberry Valley project, Utah, said monthly payments to be paid through the 'United States Employees' Compensation Commission.

Suit to Enjoin Issuance of Land Patent.

If the right of a prior applicant is denied by the issuance of a patent to another, he has an adequate remedy by a suit in equity to have the patent issued to the subsequent applicant impressed with a trust in his favor, and, having such a remedy, he is not entitled to an injunction restraining the Secretary of the Interior and the Commissioner of the General Land Office from issuing such a patent, and requiring them to cancel the entry of the subsequent applicant. Where the Department of the Interior has decided a land contest in favor of one applicant, that applicant is a necessary party to a suit to restrain the Secretary of the Interior and the Commissioner of the General Land Office from issuing the patent. Where the decision of the Secretary of the Interior in deciding a land contest was neither arbitrary nor capricious, he was acting within his power, and his judgment and discretion can not be controlled by injunction. (*Cohen v. Fall*, Secretary of the Interior, et al., 284 F. 734.)

Rights Respecting Public Lands.

Homestead rights can not be acquired in land previously withdrawn from entry as passing under a railroad grant. Decisions of the Land Office are not reviewable by the courts for errors of fact or of mixed fact and law, but only for errors of law. A patent issued by the Land Department not void on its face can not be questioned either directly or collaterally by one who does not show himself to be in privity with the paramount source of title. Fraud which will entitle an unsuccessful claimant to relief in the courts must be such as prevented him from fully presenting his side of the controversy. As between conflicting claims to public lands, he whose initiation is first in time, if adequately followed up, is deemed first in right, and, if his claim is finally approved, his right relates back to the date of its initiation to the exclusion of any intervening claim. To entitle a homestead entryman to patent for the surface of land subsequently ascertained to be valuable for coal under act March 3, 1909 (35 Stat. 844), and act June 22, 1910 (36 Stat. 583), his entry must have been made in good faith, without knowledge of the mineral character of the land. (*Christie et al. v. Great Northern Ry. Co. et al.*, 284 F. 702.)

Congressional Bills of Interest to Our Readers.

IN THE HOUSE.

H. R. 14036.—“A bill for the relief of water users under United States reclamation projects,” introduced January 26, 1923, by Representative Carl Hayden, of Arizona.

H. R. 14040.—“A bill to extend payments on reclamation projects,” introduced January 26, 1923, by Representative Addison T. Smith, of Idaho.

H. R. 14103.—“A bill for the relief of Erve W. Johnson,” introduced January 30, 1923, by Representative Addison T. Smith, of Idaho.

H. R. 14104.—“A bill for the relief of Nora B. Sherrier Johnson,” introduced January 30, 1923, by Representative Addison T. Smith, of Idaho.

IN THE SENATE.

S. 4349.—“A bill authorizing the Secretary of the Interior to deposit in State and national banks and trust companies funds accruing under the act of June 17, 1902,” introduced January 16, 1923, by Hon. Charles L. McNary, of Oregon.

Dr. Bernard E. Fernow, 1851-1923.

The reclamation law was one of the results of the conservation movement; that in turn was the outgrowth of the efforts of several notable men, of whom one has lately passed away—Bernard E. Fernow, first forester of the United States, who died on February 6, 1923, at Toronto, Canada, at the age of 72. He was one of the early and effective advocates of a policy of conservation and use of the forest resources of the country.

His was a “voice crying in the wilderness” and getting apparently no response; or, at most, a partially concealed ridicule from so-called “practical” lumbermen.

When he came to the United States in 1876 he was impressed, as were other young men educated in forestry, with the waste of wood and the great opportunities for development of the sound policy of timber conservation. For years he talked, wrote, and urged the adoption of a system of forest protection from fire and wanton waste, modeled upon the methods found practicable in Europe. Finally, in 1886, he was appointed Chief of the Division of Forestry in the United States Department of Agriculture. As all national lands, including forests, were then under the Department of the Interior, he as chief forester could do little beyond experimentation and demonstration on a small scale on privately owned lands of the benefits of a forest policy; nevertheless, the facts he contributed had their part in calling the public attention to the importance of forest preservation, and incidentally of the relation of forest cover to the water supply of the country, particularly in the West, where irrigation is necessary.

FROST CONDITIONS ON MESA DIVISION, YUMA PROJECT, ARIZONA.

By Porter J. Preston, Project Manager,

Low temperature prevailed on the Yuma Mesa during the week ending January 6, reaching a minimum of 32° at Hill's orchard and south of the mesa experimental farm, while a little farther east on the mesa, in a lower spot, 30° was recorded, but no damage to tender vegetation resulted at these points, and the large acreage of garden truck, consisting of summer squash, cucumbers, tomatoes, and melons, went through the cold spell without injury.

In the Yuma Valley even the vegetation that will stand considerable frost was damaged, especially young peas.

In the South Gila Valley, where some trucking is done, the temperature dropped to 23°, and the local weather bureau recorded a like temperature at Brawley, in the Imperial Valley.

Garden truck suffered in the Imperial Valley. The hardier crops were not killed, but were considerably retarded, and a large part of the more tender crops was killed.

The fact that the mesa withstood the cold spell without damage to the most tender vegetation is very reassuring, and the farmer will realize more and more that there is less possibility of loss from freezing on the mesa than in almost any locality in this region. It will thus be to the advantage of the mesa, as the truck gardener fears the freezing of his crop more than any other thing.

Belle Fourche Project Policy.

Mr. B. E. Hayden, project manager of the Belle Fourche project, South Dakota, sums up as follows the policy of the management of the project:

To give the best service possible at the lowest cost consistent with good management, to give everybody a square deal, to pay as little attention as permissible to adverse criticism, and then—“let the rest of the world go by.”

Recent Service Orders.

CIRCULAR LETTERS.

No.

1189. Selection of physicians under the provisions of the hospital fund.
1190. Survey of gasoline purchases by the Federal Government.
1191. Report in regard to automobiles and garages, Senate Resolution No. 399.
1192. Public notice of annual water charges.
1193. Purchases—Advertisement, proposal, and acceptance for immediate delivery.

ADMINISTRATIVE AND STATISTICAL PROGRESS REPORTS FOR JANUARY, 1923.

Monthly conditions of principal Reclamation Service Reservoirs for January, 1923.

[Elevation above sea level.]

State and project.	Reservoir.	Available capacity in acre-feet.	Elevation.		Storage in acre-feet.			Out-flow in acre-feet.	Elevation of water surface.		
			Spill-way crest. ¹	Lowest gate sill. ²	Beginning of month.	End of month.	Maximum.		Beginning of month.	End of month.	Maximum.
Arizona, Salt River	Roosevelt ³	1,305,000	2128.1	1924.6	549,144	535,501	549,144	13,643	2089.95	2088.61	2089.95
California, Orland	East Park	51,000	1199.68	1111.68	15,290	31,770	31,770	.....	1172.58	1187.68	1187.68
Idaho:											
Boise	Arrowrock	280,000	3211	2956	34,334	45,500	45,500	43,982	3079.2	3093	3093
	Deer Flat	177,000	2518	2488	49,096	81,340	81,340	.....	2501.4	2506.6	2506.6
Minidoka	Lake Wolcott	95,180	4245	4236	88,900	88,080	91,180	380,101	4244.46	4244.39	4244.57
	Jackson Lake	847,000	6769	6728	314,240	345,130	345,130	.....	6746.4	6747.83	6747.83
Montana:											
Milk River	Nelson	70,000	2223	2200	27,300	26,200	27,300	.....	2212.55	2212.15	2212.55
St. Mary storage	Sherburne	66,000	4788	4720	.....	.....	.....	.....	.....	.....	.....
Sun River	Willow Creek	16,700	4130	4085	11,847	11,847	11,847	180	4124.9	4124.9	4124.9
Nebraska-Wyoming North Platte	Pathfinder	1,070,000	5852	5670	296,900	320,140	320,140	4,650	5797	5799.8	5799.8
	Lake Alice	11,400	4182	4159	7,699	5,566	7,699	.....	4175.2	4173.3	4175.2
	Lake Minatare	60,760	4125	4074	42,671	41,194	42,671	.....	4115.7	4115.2	4115.7
Nevada, Newlands	Lake Tahoe	120,000	6230	6224	.....	.....	.....	17,483	6225.82	6225.98	6225.98
	Lahontan	273,600	4162	4060	200,600	214,500	214,500	2,846	4153.6	4155.4	4155.4
New Mexico:											
Carlsbad	McMillan	45,000	3267.7	3241.6	8,700	13,500	13,500	.....	3259.1	3260.7	3260.7
Rio Grande	Elephant Butte	2,638,000	4407	4231.5	1,410,084	1,464,074	1,464,074	4,820	4371.2	4372	4372
Oregon, Umatilla	Cold Springs	50,000	621.5	560	3,975	17,100	17,100	.....	590.53	593.93	593.93
Oregon-California, Klamath	Clear Lake	462,000	4540	4514	358,000	363,000	363,000	.....	4536	4536.2	4536.2
South Dakota, Belle Fourche	Belle Fourche	203,000	2975	2920	102,200	115,640	115,640	.....	2960.1	2962.3	2962.3
Utah, Strawberry Valley	Strawberry	250,000	7558	7517	206,900	209,100	209,100	.....	7552	7552.3	7552.3
Washington:											
Okanogan	Conconully	14,400	2290	2232	2,346	2,613	2,613	.....	2256.3	2257.4	2257.4
Yakima	Bumping Lake	34,000	3426	3389	11,550	19,550	23,230	3,680	3405.4	3413.9	3417.3
	Lake Cle Elum	20,800	2134	2122	26,660	25,055	29,615	4,560	2135.1	2133.4	2136.4
	Lake Kachess	210,000	2258	2192	50,200	81,155	81,155	.....	2210.7	2221.6	2221.6
	Lake Keechelus	152,000	2515	2425	38,365	72,390	72,390	.....	2454.5	2477.1	2477.1
Wyoming, Shoshone	Shoshone	456,600	5360	5132.3	330,798	329,203	330,798	15,227	5340.6	5338.7	5340.6

¹ Or maximum storage.² Or zero storage.³ Zero water depth at elevation 1902.2.⁴ Amount of silt shown by silt survey deducted from original capacity.⁵ Proposed regulation.⁶ Estimated low-water limit under proposed plan of regulation.⁷ Draft for vested power rights.⁸ Elevation of reservoir raised 12 inches by stop logs in spillway.

SALT RIVER PROJECT, ARIZONA.

Two new maintenance crews were started during January, making a total of four maintenance crews in the field, which with a daily average of 198 man days and 10 stock days, accomplished the following work: 168 miles lateral cleaned, 112 old structures repaired, 2,081 feet riprap placed, 37 cubic yards concrete placed, 392 cubic yards earth excavated, and 755 cubic yards earth embankment placed.

In addition, the Ruth dredger bermed 29,900 feet on the Western Canal, moving approximately 3,800 cubic yards.

The P. & H. one-half-yard machine completed excavating sand deposited in the Arizona Canal by Cave Creek. On January 6 it moved to the Cross Cut Drain and backfilled 1,800 linear feet and enlarged the Old Cross Cut Canal for 1,606 linear feet. The following work was accomplished: 1½ miles new waste ditch complete, 1½ miles new irrigation ditch completed, 16 new structures installed, 277 linear feet 24-inch concrete pipe placed, 34 linear feet 24-inch corrugated-iron pipe placed, 50 linear feet 30-inch corrugated-iron pipe placed, 13½ cubic yards concrete placed, 6,266 cubic yards earth excavated, and 111 cubic yards earth embankment placed.

Work continued on widening the Eastern Canal; day and night powder crews drilled 3,419 feet of holes and shot 2,948 feet of holes. The Monighan 2-yard machine moved 9,490 cubic yards of material.

The following work on the Cross Cut Drain was accomplished during the month: 1,540 linear feet excavated by the Austin, 1,795 linear feet 10-inch tile laid, 1,466 linear feet gravel backfill, and 1,800 linear feet earth backfill by P. & H. (see P. & H. aobve).

Operation of power system.—Total power generated during month, 4,403,575 kilowatt hours; maximum daily output (January 19), 219,560 kilowatt hours; maximum load (January 16), 9,655 kilowatt hours; maximum daily average load (January 18), 9,150 kilowatt hours; highest daily load factor, 99 per cent; lowest daily load factor, 58.7 per cent; monthly load factor, 61.9 per cent.

The output of the power system was considerably in excess of the previous month owing to the relative high demand for irrigation water during January. Owing to a rain which occurred on January 26 the demand for irrigation water dropped, so that the power output from that date until the end of the month was considerably less than the average for the month.

The Roosevelt and Cross Cut power plants operated continuously during the month. The South Consolidated plant operated 99.3 per cent of the time. The Arizona Falls plant operated 69.9 per cent of the time. During the remainder of the month the plant was shut down owing to lack of water in the Arizona Canal. The Chandler plant operated 99.5 per cent of the time, being shut down for a period for inspection and adjustment of the turbine. The substations operated without trouble during the month.—C. C. Cragin.

YUMA PROJECT, ARIZONA-CALIFORNIA.

Alfalfa made good growth and harvesting was in progress throughout January. The cold spell of January 3 and 4 froze the pea pods, but vines were little hurt, and the new crop is about to be picked. Almond, lemon, and peach trees were in bloom and orange trees were budding; 6,300 acre-feet of water was delivered to farms.

The 30-B Bucyrus cleaned 1.6 miles on the Main Drain. The P. & H. cleaned one-half mile on the East Main Canal, and the four Ruth dredges cleaned a total of 22.5 miles of laterals.

Mesa Division.—Work was continued on the manufacture of concrete pipe, 3,828 linear feet of pipe having been completed, mostly in 8-foot lengths; 303 pedestals for flume were also cast, the total being 254.7 cubic yards of concrete. Eight structures, principally in open ditches, were completed, involving 16 cubic yards of concrete. On January 15 a small fire destroyed the crusher plant, but prompt and effective work prevented the fire from spreading and minimized the loss, which is estimated at \$2,000. Manufacture of pipe was only partially interrupted for 11 days.

The contract for earthwork was completed on January 31, except for a small amount of finishing.

The 16-inch Krogh pump was operated 190 hours, pumping 285 acre-feet.—*Porter J. Preston.*

ORLAND PROJECT, CALIFORNIA.

January rainfall, amounting to 1.50 inches, was about 2 inches less than the monthly mean. The seasonal precipitation to date, however, was 2.34 in excess of the normal seasonal to date. Although a mean temperature of 29° occurred on three occasions during the month, no damage to crops resulted.

Rain, occurring on frequent occasions, interfered considerably with the progress of concrete lining being placed under supplemental construction, of

which 15,500 square yards were placed on 2.1 miles of laterals on the distribution system. Maintenance work consisted of cleaning and repairing 19 miles of laterals. Weather conditions permitted the hauling and placing of the stand for the additional auxiliary gate at East Park Dam which fully completes the installation of the new gate. The East Park Feed Canal was in continuous operation, delivering 10,460 acre-feet to the reservoir.

The third session of the hearings in connection with the Stony Creek water-right adjudication suit was held at Willows from January 4 to January 12, at the conclusion of which an adjournment was taken until February 6.—*R. C. E. Weber.*

GRAND VALLEY PROJECT, COLORADO.

January weather continued to be exceptionally mild and conditions were favorable for outside work.

The only crop being marketed in any quantity was alfalfa hay, which was in good demand at prices ranging from \$10 to \$15 per ton. The Holly Sugar Co. was signing up beet acreage for the coming season. The contract offered was practically the same as last season's, the price being fixed on a sliding scale basis.

Operation and maintenance work was confined to repair of structures on the canal and lateral systems by the regular ditchriders. A rock-filled timber crib was also constructed on the Colorado River below the diversion dam to protect the canal bank from erosion. On drainage construction two Monighan draglines were operated during the first half of the month, completing 2,175 linear feet of drain involving 10,800 cubic yards of excavation. The machines were then laid up for a general overhauling.

The Orchard Mesa construction work was pushed as rapidly as possible with a force which was increased to 84 men. The excavation for the Colorado River siphon was opened up to a point nearly half way across the river, and the cofferdam was com-

Crop report, Grand Valley project, Colorado, 1922.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay.....	4,982	Ton.....	13,268	2.66	\$10.00	\$132,680	\$26.63
Alfalfa seed.....	401	Bushel.....	860	2.14	8.53	7,340	18.30
Apples.....	190	Pound.....	939,600	4,945.00	.013	12,561	66.11
Beans.....	315	Bushel.....	3,812	12.10	4.37	16,668	52.91
Beets, sugar.....	989	Ton.....	9,521	9.63	8.00	76,168	77.02
Beet tops.....	989	Acre.....				1,978	2.00
Corn, Indian.....	1,236	Bushel.....	24,595	19.90	.80	19,655	15.90
Corn fodder.....	1,316	Ton.....	2,366	1.80	2.79	6,606	5.02
Garden.....	72	Acre.....				5,139	71.37
Hay.....	47	Ton.....	60	1.28	9.37	562	11.96
Oats.....	680	Bushel.....	11,991	17.63	.57	6,829	10.04
Potatoes.....	771	do.....	105,638	137.01	.34	35,627	46.21
Straw.....	2,668	Acre.....				2,668	1.00
Tomatoes.....	68	Ton.....	688	10.12	9.00	6,192	91.06
Wheat.....	1,988	Bushel.....	30,570	15.38	.80	24,353	12.25
Miscellaneous.....	293					10,734	36.64
Less duplicated areas.....	5,165						
Total and average.....						365,760	\$1.88
Total cropped.....	11,840						
Nonbearing orchard.....	18						
Young alfalfa.....	811						
Ground fall plowed.....	1,542						
Miscellaneous.....	332						
Less duplicated areas.....	2,177						
Total irrigated.....		12,370	Total irrigable area farms reported.....		18,952	387	37.9
			Total irrigated area farms reported under rental contracts.....		12,370	381	24.7
			Total cropped area farms reported.....		11,840	377	23.7

pleted as far as it will be extended from the west side. Forms and steel were erected for the wasteway structure and about 100 feet of the siphon barrel and preparations were completed to resume running concrete at the end of the month. On the excavation for the flume bench 5,000 cubic yards, consisting largely of solid rock, were excavated. Work was started on the reconstruction of tunnel on Canal No. 1 and 52 linear feet were excavated and timbered.—*S. O. Harper.*

UNCOMPAHGRE PROJECT, COLORADO.

The uncollected water rentals due from the season 1921 on January 31 amounted to \$3,079.01. The total cash collections on January 31 on account of water rentals for the season 1922 amounted to \$79,155.

Owing to the mild weather which prevailed during the entire month it was found possible to carry a continuous head in nearly all of the project canals and laterals for stock and domestic purposes. In fact the month of January has been the best month for many years to accomplish winter maintenance work, and as a consequence much of the brushing and cleaning work has been completed.

The Dolores wasteway on the West Canal and North Mesa Lateral headgate were enlarged. Metal flumes were examined and the necessary repair work accomplished. A number of miscellaneous tap boxes and minor repairs to other structures were also completed.

On account of frost conditions the P. & H. dragline was idle, and as a consequence was overhauled in the Montrose yards preparatory for the spring work.

Work was begun by a small crew at the Gunnison Tunnel on miscellaneous improvement work, such as extending the concrete lining to the approaches of

the short sections and the removal of projections in the rock sections of the tunnel.

Despite the mild weather which has prevailed in the valley, the reports received from the Weather Bureau show that the snowfall on the watersheds is much above the normal for this time of the year, and as a consequence it is anticipated that an ample water supply will be had for the irrigation season.—*L. J. Foster.*

BOISE PROJECT, IDAHO.

Mild weather prevailed during the greater part of January. Precipitation in the form of rain and snow occurred at intervals. The total amounted to 1.62 inches, or 0.27 of an inch below normal.

There were a number of idle men and teams, but the indications were that there will be sufficient work to afford them employment as soon as weather conditions become settled in the spring.

Plowing was general until the 26th, when freezing weather occurred. A large number of sheep and cattle were fed, but the weather was too mild and damp for the best results in outdoor feeding. The fruit men were busy pruning and cleaning up their orchards.

The run-off from the Boise River watershed was about 80 per cent of normal. January storms deposited a large amount of snow in the mountains. The indications were that the water supply for the coming season will be good.

Water for filling Deer Flat Reservoir was run through the Main Canal until the 28th, when it was necessary to stop operations on account of ice conditions. The manufacture of concrete pipe was begun to replace the Robinson Hill wood-stave siphon, which had deteriorated. Several small crews were engaged during favorable weather in cleaning laterals and replacing structures.

Crop report, King Hill project, Idaho, 1922.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay.....	3,474	Ton.....	14,557	4.20	\$9.10	\$132,240	\$38.02
Alfalfa seed.....	113	Bushel.....	570	5.02	6.80	3,881	34.35
Apples.....	413	Pound.....	1,091,350	2,640.00	.015	15,662	38.00
Barley.....	30	Bushel.....	465	15.50	.49	229	7.63
Clover hay.....	25	Ton.....	47	1.90	8.30	200	15.60
Corn, Indian.....	181	Bushel.....	6,350	35.00	.92	5,848	32.31
Corn, fodder.....	10	Ton.....	97	9.70	3.25	315	31.50
Fruit, small.....	14	Pound.....	4,260	304.00	.10	421	30.08
Garden.....	57					5,048	88.50
Hay (other than alfalfa).....	121	Ton.....	221	1.80	5.70	1,147	9.50
Oats.....	115	Bushel.....	4,385	38.00	.57	2,501	21.70
Onions.....	2	Pound.....	11,000	5,500.00	.034	880	190.00
Pasture.....	669					6,955	10.40
Pears.....	25	Pound.....	8,220	329.00	.038	311	12.40
Prunes.....	8	do.....	17,700	2,212.00	.024	437	54.62
Potatoes, white.....	515	Bushel.....	112,233	217.00	.39	39,055	75.80
Melons.....	24	Pound.....	86,256	3,700.00	.019	1,705	74.00
Wheat.....	255	Bushel.....	4,767	18.70	.71	3,375	13.20
Total cropped.....	6,050	Total and average.....				219,900	36.33
Nonbearing orchard.....	240						
Young alfalfa.....	376						
Fall-plowed.....	267						
Less duplicated areas.....	493						
Total irrigated.....	6,440						
			Areas.	Acres.	Farms.	Per cent of project.	
			Total irrigable area farms reported.....	9,165	175	54	
			Total irrigated area farms reported.....	6,440	175	38	
			Under contracts with U. S. Reclamation Service.....	9,165	175	54	
			Total cropped area farms reported....	6,050	175	35.9	

The Austin No. 4 dragline continued work on the upper Mason Creek Drain. The excavation of the Drew Drain was resumed with the P. & H. No. 208 drag line. Good progress was made on both drains.

Field work consisted of giving lines and grades for the drainage and operation and maintenance work in progress. Office work was continued in connection with drainage studies and Malheur secondary investigations. A portion of the data for the 1922 project history was assembled.—*J. B. Bond.*

KING HILL PROJECT, IDAHO.

Weather conditions from the 1st to the 26th were exceptionally favorable for January. On the 27th a 6-inch snowfall, followed by freezing weather, materially delayed all work except the manufacture of pipe.

Government forces averaged 250 men and 40 head of stock. Six camps were maintained until the 23d, when one camp was dismantled.

With the exception of 500 yards of excavation between stations 757 and 783. Main Canal extension, and one bank of the Main Canal between stations 645 and 758, the canal enlargement is now complete. Repairs to siphon No. 1 were continued throughout the month. At this structure all the wood-stave pipe to be rebuilt was torn down and remilled, 2,120 cubic yards of excavation moved, 70 cubic yards of reinforced concrete paving under pipe placed, and 21 yards of concrete placed in the west pipe pier and foundation for outlet structure. The bridge across Snake River supporting the siphon was realigned, as it had shifted 9 inches off center. On Glenns Ferry Siphon rebuilding the wood-stave pipe was completed and the concrete outlet structure poured. At Cold Springs Siphon 17 cubic yards of reinforced concrete were placed in the outlet structure, the wood-stave barrel was rebuilt, and cradles were renewed. One thousand three hundred and ninety-five yards of excavation were removed from the metal flume bench. Pipe trenches for Bennett Creek Siphon, lateral 9 B, 9 BA, and 11 E were completed, as well as excavation of laterals 5 AA and 11 E, a total of 11,985 yards of material having been removed during the month on the lateral work. Work was begun on laterals 3 E and 4 E and inlet for pump No. 2 penstock. Timber structures were installed as follows: Ten farm turnouts from Main Canal; 19 farm turnouts from laterals; 13 drops. 5 checks, and 3 lateral turnouts. Timber trestle for lateral 4 metal flume was erected. Nine thousand three hundred and thirty-two feet of lock-joint pipe varying in size from 12 to 54-inch diameter and 21 elbow sections were manufactured in the lock-joint pipe plant; 3,548 feet of the pipe were hauled to site and 156 feet laid.

Schedule 46 to 50 Main Canal extension enlargement were completed by G. M. Brown. R. A. Coffelt and T. F. Wright completed informal contracts for the excavation of pipe trench for lateral 4-E siphon and the Basin Drain.

One field party was engaged giving lines and grades to construction forces, locating and cross sectioning laterals, and taking estimates.—*A. M. Rawn.*

MINIDOKA PROJECT, IDAHO.

The weather remained dry and comparatively warm throughout January.

From January 9 to 12 inclusive, the annual Idaho State Seed Show was held at Burley. All the exhibits, which included great varieties of grain, grass and clover seed, and potatoes, were of unusual excellence.

There were 105 prizes awarded, of which 33 were carried off by Minidoka project farmers. Potato exhibits were awarded 20 prizes; 13 of these being won by local men.

As an aid to the farmers in disposing of a part or all of their lands, the Burley Improved Farms Co. was organized on the South Side Pumping Division and had received some options.

Hydrometric data for 1922 were worked up for the project history and the annual cost budget for 1923 was prepared and submitted.

At American Falls one survey party continued its work of surveying right of way for the reservoir.—*Barry Dibble.*

HUNTLEY PROJECT, MONTANA.

Unusually mild winter temperatures prevailed during January.

Field work was confined almost entirely to maintenance work on tile drains, replacing decayed trap boxes, repairing breaks in the tile, removing obstructions from the tile, and cleaning up the drains generally.—*A. R. McGinness.*

MILK RIVER PROJECT, MONTANA.

January weather was in general mild.

Maintenance work included continuance of refilling hole washed below Dodson Dam, revetting the bed and banks of the Dodson South Canal below Rocky Point, mile 8, and minor repairs to a few structures.—*Geo. E. Stratton.*

ST. MARY STORAGE.

Except for the last few days of the month January weather was rather mild.

No construction or operation and maintenance work was done. The office work consisted of work on annual reports and routine work.—*H. L. Scott.*

SUN RIVER PROJECT, MONTANA.

Weather conditions were favorable for outside work for the first three weeks of January, making it possible to complete the canal embankment at the break in Greenfields Main Canal, mile 3. A new gravel pit was opened and the soil removed in readiness for screening sand and gravel for repairs to the canal as soon as weather conditions are favorable. Reid Bros. hauled sand to the site of all concrete structures.

It was not possible to do any work with the dragline on Open Drain A, but the machine was repaired and put in good condition for next spring. Three timber bridges were erected across this drain and the concrete foundation completed for the fourth bridge. A measuring weir was installed. Location surveys were completed on Open Drains B and C, test pits were dug, and observations taken on the ground water table.

The telephone system on the north side of the river was thoroughly repaired and 131 poles stubbed or reset. Farmers on the project were engaged in baling hay and marketing farm products. The following shipments were made from the three principal stations; 22 cars of wheat, 10 cars of alfalfa, 1 car of potatoes and 1 car of hogs.—*Geo. O. Sanford.*

LOWER YELLOWSTONE PROJECT.

January was mild and ideal for range cattle or any kind of stock.

The compilation of the crop census shows that the average gross return per acre for irrigated crops in 1922 was \$21.68. The 1921 average for irrigated crops was \$15.23 per acre. The returns from sugar beets were the best of any crops.

More live stock was being fed on the project this winter than for several seasons and good profits were being realized by those engaged in feeding lambs. About 3,000 head of stock were being fed in the vicinity of Fairview and Dore.—L. H. Mitchell.

Prevailing crop prices at close of January, 1923.

Project.	Alfalfa hay, per ton.		Barley, per bushel.	Oats, per bushel.	Wheat, per bushel.	Potatoes, per bushel.
	In stack.	Baled at shipping point.				
Salt River.....	\$16.00	\$22.00	\$1.00	\$0.70	\$1.30	.....
Yuma.....	13.00	17.00	.....	.....	.....	.....
Orland.....	13.50	16.50	.65	.....	1.80	.....
Grand Valley.....	10.00	15.00	.....	.65	1.10	\$0.35
Uncompahgre.....	7.00	.....	.75	.55	1.05	.15
Boise.....	8.00	11.00	.55	.45	.84	.20
King Hill.....	10.00	.....	.....	.....	.....	.....
Minidoka.....	6-7	9-10	.84	.84	.96	.24
Huntley.....	.....	.....	.....	.....	.....	.....
Milk River.....	10.00	13.00	.31	.45	.98	.40
Sun River.....	10.00	14.00	.75	.65	.97	.25
Lower Yellowstone.....	7-10	.....	.36	.28	1.01	.....
North Platte.....	10-12	.....	.....	.....	.....	.42
Newlands.....	8.00	12.00	1.05	.....	1.30	.....
Carlsbad.....	25.00	.....	.....	.....	.....	.....
Rio Grande.....	25-28	.....	.....	.....	.....	.....
North Dakota pumping.....	15.00	.....	.....	.....	1.02	.....
Umatilla.....	10.00	115.00	.....	.....	.....	.....
Klamath.....	8-10	.....	.72	.64	1.05	.60
Belle Fourche.....	6.00	12.00	.43	.37	.90	.45
Strawberry Valley.....	11.00	14.00	1.00	.75	1.05	.....
Okanogan.....	.....	.....	.....	.....	.....	.60
Yakima.....	.....	16-20	.....	.....	.....	.30
Riverton.....	10.00	14.00	.68	.64	.83	.45
Shoshone.....	8.00	10.50	.....	.60	.79	.30
Indian projects:	.....	.....	.....	.....	.....	.....
Blackfeet.....	10.00	.....	.68	.45	.84	.....
Flathead.....	10.00	15.00	.....	.....	.91	.30
Fort Peck.....	10.00	.....	.....	.26	1.08	.50

NORTH PLATTE PROJECT, NEBRASKA-WYOMING.

The concrete work was completed on the Sand Point Culvert and only some work on extending the paving of the back fill remained to be finished. Back filling will be delayed until the frost is out of the ground. An average force of about 12 men carried on miscellaneous riprap and repair jobs throughout the division. On the Fort Laramie Division the canal was operated for the Lingle power plant without any difficulty or interruption. An average force of about 8 men carried on miscellaneous road surfacing and riprapping jobs on the canal banks. Estimates of the cost of operating for the season of 1923 were prepared for each watermaster's division. On the Pathfinder Division, sand hauling was in progress and preparations were made for grouting Conduit No. 2 in the South Tunnel.

On the Interstate Division, Main Canal enlargement was in progress with two Monaghan gasoline draglines and two P. and H. gasoline draglines, and the Bucyrus class 14 gasoline dragline was to be moved from the Northport Division to the Interstate Canal just west of Dry Spottedtail Creek. On the Ft. Laramie Division two Bucyrus electric draglines were employed on canal excavation, one Bucyrus electric on drainage work, and one Austin gasoline dragline

on the excavation of the Horse Creek Siphon trench. Miscellaneous structure work by Government forces and contractors was in progress on the Horse Creek Lateral system. The work on the Horse Creek Siphon was progressing satisfactorily and the concrete had been placed for the inlet and transition and for the floor and cut-off walls of the outlet involving 280 cubic yards of concrete. On the Northport Division the Bucyrus gasoline dragline had completed work on Branch A of the Indian Creek Drain and the construction of bridges was under way. Miscellaneous lateral structures and bridges on the Indian Creek Drain together with the Dobson Lake structure will be completed by April 1, thus completing the division.

Red potatoes, grade No. 1, were worth 75 cents per hundredweight; white potatoes were not marketable at any price. Also on account of the lack of market and transportation facilities at harvest time which caused the storage of potatoes in pits, it is estimated that there will be at least a 50 per cent loss in the amount harvested.

The Great Western Sugar Co. announced that its minimum payment under its 1923 contracts with the growers will be \$5.50 per ton. This minimum is based upon a 15 per cent sugar content and an average net price of 5 cents per pound for sugar. Additional payments per ton are dependent upon additional sugar content and a higher net price for sugar sold. The announcement was apparently unsatisfactory to the local beet growers association.

About 8,000 sheep had been shipped from the project at a profit of approximately \$1 per head.—Andrew Weiss.

NEWLANDS PROJECT, NEVADA.

January weather conditions were favorable for project work except during the last week of the month when snow and frozen ground interfered with cleaning of laterals.

The Lahontan power plant was operated continuously, alternating between the Truckee Canal and Lahontan Reservoir for its water supply. This method was followed in order to reduce the Truckee Canal flow during a portion of each day to facilitate the work of placing temporary timbering of Truckee Canal tunnels Nos. 1 and 3. This work was in progress and will be completed during February.

Repairs were being made to riprap on upstream face of Lahontan Dam. Displacement of riprap was caused by wave action.

An average of 32 men and 37 head of stock were engaged on regular maintenance work cleaning ditches, repairing structures, etc. Six and one-fourth miles of laterals were cleaned. Six minor timber structures were installed and eight similar structures were repaired by maintenance forces. Thirteen ditch riders assisted in this work.

Drainage construction work was continued, the quantity of material moved being about 226,000 cubic yards, exceeding any month except May, 1922, since work was commenced. Six dragline excavators were engaged on this work. One small Austin dragline was operated on cleaning old surface drains. Thirty-five drainage structures involving 54,450 feet B. M. of lumber were installed.

Project Manager J. F. Richardson was absent from the project between January 8-27 attending conferences in Washington, D. C., relating to agricultural and economic conditions on the projects. Farm Supt. F. B. Headley and Agriculturist L. E. Cline of the local experiment farm were also in attendance.

A large mass meeting of water users was held in Fallon on January 13 to express project sentiment on the proposed leasing of the Lahontan Dam to the Canyon Power Co. for a 10-year period following the expiration of their present lease in 1924. This meeting was well attended by water users from all sections of the project. A resolution favoring the contract with the Canyon Power Co. and the immediate commencement of work on Spanish Springs reservoir was balloted on and passed, the vote being 102 in favor and 55 against the resolution. The meeting was of such a representative nature that this vote indicated that the water users as a whole are strongly in favor of the new power company contract.—*John F. Richardson.*

CARLSBAD PROJECT, NEW MEXICO.

The weather was warm and without precipitation practically during the entire month of January. This was favorable for regular work on the farms and for other maintenance work. Conditions on the range continue fair, and about 15,000 head of sheep and several small herds of cattle were in pasture on the project due to the poor condition of the range. The latter part of the month was characterized by several cloudy days.

The regular foreman with an average of three men was employed doing rock-protection work at road crossings and building headgates during most of the month. On the 20th the several ditch riders, with

Statement of receipts, by sources, and expenditures and net investment, by projects, July to December 31, 1922, and to December 31, 1922, United States Reclamation Service.

[EXCLUSIVE OF YUMA AUXILIARY AND INDIAN PROJECTS.]

	Receipts.		Expenditures.		Excess of expenditures over receipts, July to December, 1922.	Net investment to Dec. 31, 1922.
	July to December, inclusive, 1922.	Total to Dec. 31, 1922.	July to December, inclusive, 1922.	Total to date and unexpended balance, Dec. 31, 1922.		
Capital funds:						
Reclamation fund—						
Proceeds, sale of public lands.....	\$396,462.06	\$105,216,711.62				
Proceeds, sale of town sites.....	7,641.21	576,004.85				
Proceeds, potassium royalties.....	1,092.00	15,312.18				
Proceeds, mineral leasing act—						
Past production.....	8,981.61	4,180,460.79				
Current production.....	717,581.09	4,350,573.78				
Proceeds, Federal water power leases.....	2.24	108.55				
Judgments, Court of Claims.....		550,347.58				
Increase of compensation appropriation.....	140,524.77	2,349,371.45				
Rio Grande Dam appropriation.....		1,000,000.00				
Wind River (Riverton) Indian appropriation.....		359,432.41				
Subtotal.....	1,772,284.98	118,598,323.21				
Salt River.....	303,313.97	5,037,479.20		\$14,671,484.24	\$303,313.97	\$9,634,005.04
Yuma.....	204,072.01	2,732,273.11	\$193,572.51	11,836,338.14	110,191.00	9,104,065.03
Orland.....	102,092.39	596,520.16	35,815.38	1,433,666.90	167,177.01	837,146.74
Grand Valley.....	28,769.30	285,813.16	172,403.10	4,293,607.49	143,638.20	4,007,794.33
Uncompaggre.....	43,846.79	1,351,963.12	63,279.14	8,054,594.69	19,432.35	6,702,631.57
Boise.....	294,094.00	3,845,187.25	300,759.97	15,525,938.02	6,095.97	11,680,750.77
King Hill.....	2,441.02	70,201.57	165,777.17	1,780,816.88	163,336.15	1,710,615.31
Minidoka.....	325,238.25	4,665,999.19	114,191.31	9,105,067.55	121,046.94	4,439,098.36
Garden City.....	20.10	57,658.87		390,495.54	120.10	332,836.67
Huntley.....	24,522.47	732,293.05	23,123.48	2,404,263.32	11,398.99	1,671,970.27
Milk River.....	11,020.68	323,698.91	157,316.37	7,151,090.13	145,190.69	6,827,391.22
Sun River.....	13,107.00	415,525.37	108,414.78	4,507,984.29	95,307.78	4,092,458.92
Lower Yellowstone.....	4,111.50	283,164.21	79,957.26	4,005,563.57	75,845.76	3,722,399.36
North Platte.....	188,136.49	3,510,209.52	524,631.30	15,860,051.91	336,494.81	12,349,842.39
Newlands.....	61,711.77	1,501,540.48	179,651.51	8,298,709.42	117,939.74	6,797,168.94
Carlsbad.....	60,129.65	806,136.03	22,577.50	1,939,615.71	137,552.15	1,133,479.68
Hondo.....		34,841.70		406,744.36		371,902.66
Rio Grande.....	50,106.79	1,864,833.97	353,747.68	14,097,118.83	303,640.89	12,232,284.86
North Dakota pumping.....	28,390.99	405,908.62	37,226.98	1,486,456.44	8,829.99	1,080,547.82
Baker.....	7.59	41,916.36	41,916.36	41,916.36	41,908.77	41,908.77
Umatilla.....	41,885.90	775,456.14	54,422.05	3,345,355.21	12,536.15	2,569,899.07
Klamath.....	79,795.48	1,166,213.45	240,076.72	4,617,073.82	160,281.24	3,450,860.37
Belle Fourche.....	28,537.56	1,069,521.18	17,048.56	4,585,837.37	11,489.00	3,516,316.19
Strawberry Valley.....	96,672.53	1,046,770.67	19,852.36	4,166,169.08	176,820.17	3,119,398.41
Okanogan.....	23,366.91	3,644,763.55	44,226.77	1,805,690.13	20,859.88	1,440,936.58
Yakima.....	324,459.72	5,686,002.46	610,884.26	14,869,943.53	286,424.54	9,183,941.07
Riverton.....	3,126.39	22,170.11	153,025.56	1,007,231.54	149,899.17	985,061.43
Shoshone.....	42,362.21	1,234,116.47	379,853.22	9,002,761.15	337,491.01	7,768,644.68
Secondary.....	52,926.13	539,558.19	103,798.57	1,828,287.66	50,872.44	1,288,729.47
Denver office¹.....	6,305.64	115,918.61	593.92	210,116.74	15,711.72	94,198.13
Field legal offices².....	919.92	1,039.79	1,395.78	8,144.00	475.86	7,104.21
Washington office³.....	17,048.39	275,696.58	3,605.82	338,410.82	14,343.07	62,714.24
Indian projects, reimbursed.....		2,997,829.24		2,997,829.24		
Civil service retirement fund².....			10,702.76	11,851.38	10,702.76	11,851.38
Total collections by projects (see analysis below)².....	\$2,465,822.04	43,816,271.52	4,213,848.15	176,086,225.46	1,748,023.11	132,269,953.94
Total expenditures by projects.....		20,000,000.00				
Bond loan.....			625,000.00	2,625,000.00		
Cash with Treasury United States.....	3,700,462.69		2,974,855.65	2,974,855.65		
Cash with special fiscal agents.....	603,647.71		728,513.62	728,513.62		
Grand total.....	8,542,217.42	182,414,594.73	8,542,217.42	182,414,594.73		

¹ Contra; indicates collections in excess of expenditures. ² Analysis: see p. 77. ³ Analysis of collections during the period July to December, 1922:

Analysis.

	Washington office.		Field legal offices.		Denver office.		Civil service retirement fund.	
	July-December, 1922.	To Dec. 31, 1922.	July-December, 1922.	To Dec. 31, 1922.	July-December, 1922.	To Dec. 31, 1922.	July-December, 1922.	To Dec. 31, 1922.
Reclamation fund disbursements.	\$107,379.78	\$4,848,367.96	\$27,472.34	\$456,686.60	\$91,348.28	\$1,220,555.90	\$24,000.00	\$66,785.00
Net increase compensation disbursements.	7,504.28	76,683.49	1,072.95	1,276.34	4,865.30	71,769.87	.....	.....
Total disbursements.	114,974.06	4,925,051.45	28,545.29	457,962.94	96,213.58	1,292,325.77	.....	.....
Less—								
Net transfers to projects.	111,368.24	4,586,640.63	27,149.51	449,818.94	95,619.66	1,082,209.03	13,297.24	54,933.62
Net expenditure.	3,605.82	338,410.82	1,395.78	8,144.00	■ ■ ■ ■	210,116.74	10,702.76	11,851.38
Reclamation fund collections.	17,948.89	275,696.58	919.92	1,039.79	6,305.64	115,918.61	.....	.....
Net investments.	-14,343.07	62,714.24	475.86	7,104.21	-5,711.72	94,198.13	10,702.76	11,851.38
Construction.	.....	.....	.....	.....	.....	.....	.....	\$1,366,942.53
Operation and maintenance.	.....	.....	.....	.....	.....	.....	.....	647,078.86
Water rental.	.....	.....	.....	.....	.....	.....	.....	110,337.54
Power and light.	.....	.....	.....	.....	.....	.....	.....	106,692.06
Unclassified.	.....	.....	.....	.....	.....	.....	.....	224,771.05
Total.	.....	.....	.....	.....	.....	.....	.....	2,465,822.04

small crews of Mexicans, started the general cleaning of laterals. This work was in progress at the close of the month.

The cotton crop was practically all picked and ginned at the end of the month except for a minor amount of bollie cotton which is being ginned. Five project gins reported 7,400 bales of cotton ginned to date, which included 1,000 bales raised on the Harroun and Harkey ranches on the south side of the Pecos and on Black River. A considerable acreage of alfalfa was being plowed up and planted to cotton. For the most part this acreage represented grassy fields which needed replowing. Alfalfa hay was selling for approximately \$25 per ton during the month.

Total miscellaneous collections for the month amounted to \$1,232.11 and total operation, maintenance, and construction collections amounted to \$16,064.90 during the month. Beginning early in January the Atchison, Topeka & Santa Fe Railway Co. was laying new rails between Lakewood and Carlsbad and employed from 300 to 500 laborers. Crop yield report for the year 1922 was completed and showed a total of \$1,197,980, or an average of \$53.41 per acre. In addition to this, crops valued at \$130,000 were raised on large farms adjacent to the project. The value of the 1922 crop, over that of the previous season, amounted to \$10 per acre.—*L. E. Foster.*

RIO GRANDE PROJECT, NEW MEXICO-TEXAS.

The principal construction work during January consisted of the extension and reconstruction of canals and laterals. Structure work on these features was mainly on the larger structures, and a great number of minor structures, including small lateral checks, bridges, and turnouts, having been completed during the previous two months.

In the Rincon Valley 24 concrete lateral checks and 50 redwood turnouts were installed in the Garfield area and construction on the Garfield Drain continued with the operation of the Monighan 1-T excavator, a culvert being installed for the second crossing under the Garfield Canal.

In the Mesilla Valley only two excavators continued on drainage construction, the Bucyrus 9½ on the

Montoya Drain, and the Monighan 2-T on the Del Rio Drain, 77,697 yards being removed from 1.3 miles of drain. Two Bucyrus 9½ and two P. & H. 206 excavators, and two Ruth ditching machines continued on canal and lateral construction, enlargements, and extensions, the draglines placing 70,436 cubic yards in 3.9 miles of canal bank; 20,685 cubic yards were removed from 8.8 miles of old lateral by Ruth machines. The principal features worked on were the raising of the Leasburg and East Side Canal banks and reconstruction of the Three Saints Lateral. Structure work consisted of the following minor structures: Sixteen bridges, 4 concrete checks, 4 linings over drain culverts, 2 lateral headings, and 113 farm turnouts; major structures under way being 2 drain culverts, Wasteway No. 1 from the Leasburg Canal, and bottom linings on the West Side Canal. In the El Paso Valley drainage excavation was interrupted on all machines by canal work and only a short distance of the River Drain was constructed. The principal work in the valley was the beginning of earthwork excavation on the Tornillo Canal. Two dragline excavators and a large team force were employed on this work. From the canal proper 13,239 yards were moved by the 30-B dragline and 28,187 by teams; the Bucyrus 9½ dragline excavated 45,306 cubic yards from the river change and sluiceway channel in the vicinity of the proposed heading. A large area of the island was being cleared and prepared for cotton which necessitates the extension of the Island Lateral system on which work was begun during the month, the P. & H. excavator being transferred from the Franklin Canal work for this purpose, a small team crew also being employed. Another team crew reconstructed the Green Lateral through the town of Clint, and the Ruth ditching machine reconstructed or cleaned 4 miles of lateral. The total of machine work amounted to 114,562 cubic yards and team work amounted to 45,291 cubic yards with the following minor structures installed: Six concrete checks in canals and 16 concrete checks in laterals, 7 bridges, 1 culvert, 1 lateral heading, and 101 turnouts; major structure work consisting of the Island Feeder Drain culvert and the Island Heading structure.

Water remained out of the system during the entire month and necessary cleaning and repair work

was done on canals and laterals. Only one contract for cleaning was in force. This was on account of recent construction or reconstruction, and the availability of Ruth machines for cleaning other ditches during the early part of the irrigation season. A small flow into the reservoir was reported and the storage increase amounted to 38,532 acre-feet. Weather conditions continued mild and favorable for construction. A large acreage of new land is being prepared especially in the El Paso Valley. Concrete pavement has now been completed the entire distance of 44 miles from El Paso to Las Cruces, N. Mex.—*L. M. Lawson.*

NORTH DAKOTA PUMPING PROJECT.

General conditions for the month were good. The winter's fall of snow remained on the ground and practically all traffic was on runners.

Maintenance was limited to necessary work in the power plant and coal mine. The coal mine cost was 37 cents per ton below the 1921 average. This is the more favorable in that a new coal body was being blocked out for the irrigation season, involving a percentage of narrow work above normal.

In the power plant the usual operations were conducted for the commercial power contract; 109,500 kilowatt-hours of electrical energy were delivered to the city of Williston, which was 1,000 kilowatt-hours less than for the same month of last year.—*Wm. S. Arthur.*

UMATILLA PROJECT, OREGON.

January had a much higher mean temperature than usual. During most of the month cloudy weather and high temperature prevailed. Toward the close the weather was clear and colder.

The high temperature insured a good flow of water in the Umatilla River, which was taken advantage of for storage purposes. During the month the depth of snow in the mountains was increased considerably and is much appreciated because of the light supply during December.

The mild weather during the forepart of January was taken advantage of by the farmers to level land, clean ditches, and prune fruit trees.

The Feed Canal was operated steadily with a full head of water until the morning of the 24th, when a break occurred near Stanfield. The water was cut out and the break repaired and concrete lined. Water was turned on again on the morning of the 29th, and the canal was operated for the balance of the month.

Work was continued intermittently on the A Canal improvements; 25 cubic yards of concrete lining were placed, completing all that portion of the canal planned for the season. One 30 second-foot capacity weir, 1 concrete check, 1 timber bridge, and 6 turnouts combined with stilling basins and weirs were constructed. Work was resumed on lateral extensions under supplemental construction on the 11th; 675 cubic yards of material were excavated, 1,185 linear feet of 16-inch and 1,840 linear feet of 12-inch concrete pipe were laid, and a small amount of work was done placing additional concrete collars on the G Lateral 20-inch wood-stave pipe.

There was a good demand for alfalfa hay with a slight drop in the price owing largely to milder weather. The supply of cars for shipment was adequate. The local bank was undergoing a thorough

renovating and the interior of the building was being rearranged in order that better service can be given.—*H. M. Schilling.*

KLAMATH PROJECT, OREGON-CALIFORNIA.

January weather averaged somewhat warmer than usual. The diversion canal was operated all month, diverting water from Lost River to the Klamath River. Sheep and cattle in larger numbers than usual were being fed on the project farms, and hay was bringing from \$8 to \$10 in the stack. Last year's hay crop will be entirely disposed of.

In the Tule Lake Division good progress was made on the construction of the canal and lateral system. The excavation was being done by four dragline excavators. In the Langell Valley Division the construction work was confined to the diversion dam.

A study was made for a hydraulic pumping plant in the Langell Valley Division. The pumping plant will be located opposite Dry Lake, at the end of the West Canal. Power will be developed at the drop to Lost River. A study was being made to develop a plan for irrigating the lands on the east side of the Langell Valley Division. Water will be supplied from the proposed Horsefly Reservoir; diversion will be from Miller Creek.

The State highway department proposes to complete the Klamath Falls-Ashland Highway during 1923. Bids will shortly be opened for grading and hardsurfacing 21 miles of road.—*Herbert D. Newell.*

BELLE FOURCHE PROJECT, SOUTH DAKOTA.

The weather during January was very fine. The precipitation was negligible and roads were in good condition.

The open weather and good roads encouraged the marketing of hay, and rather heavy shipments of both alfalfa meal and baled hay were made. The price for baled hay was \$12 f. o. b., and for hay at the meal mill \$10 per ton loose.

The Inlet Canal was in continuous operation and carried the full flow of the Belle Fourche River, amounting to 12,300 acre-feet, to the reservoir.

The pool below the diversion dam was pumped out to permit inspection of the apron at the toe of the dam. An examination showed that over a distance of nearly 200 feet along the center portion of the dam, the pavement had been loosened and displaced along its outer edge varying in width from 1 to 15 feet. The condition is not such as to menace the stability of the dam at present but should be corrected as soon as weather conditions permit.

The county commissioners held a special hearing on the 27th on the organization of the proposed Belle Fourche irrigation district at Belle Fourche. The boundaries were established in conformity with the petition and an election called for March 3.—*B. E. Hayden.*

STRAWBERRY VALLEY PROJECT, UTAH.

January weather was generally fair and mild.

The price of wheat and hay remained unchanged. The feeding of live stock was greater during the past winter than during any previous year. This condition was brought about by the unsatisfactory prices received for alfalfa hay, it being found more advantageous to feed the hay directly to live stock than endeavor to ship the hay under such adverse prices.

On January 29 and 30, representatives of water users from 15 Federal reclamation projects convened in Salt Lake City for the purpose of forming a national organization and considering ways and means of obtaining relief for the water users under the several projects and to formulate general plans for such relief for presentation to Congress. This meeting was attended by Messrs. R. F. Walter, assistant chief engineer, and James Munn, cost and property engineer of the Denver office. Results and agenda of this meeting were forwarded to the Washington and Denver offices by newspaper clippings.

The project power plant was in continuous operation, delivering 99,010 kilowatt-hours to the several project towns for which revenues amounting to \$1,876 were received. Negotiations were going on with the Denver & Rio Grande Western Railroad Co. for extending the present transmission line from Castilla Hot Springs resort to Thistle for furnishing electrical energy for the use of the railroad company.

The new Woodward governors and repair parts for the generator turbines had not been received.—W. L. Whittemore.

OKANOGAN PROJECT, WASHINGTON.

The weather was mild during most of January and favorable for pruning and other orchard work.

No operation and maintenance work was done during the month. At the end of the month all employees except the regular office force, the master mechanic, janitor and the gate tender at the Conconully and Salmon Lake Reservoirs had been laid off for the balance of the winter.

Transportation conditions had greatly improved and more cars were available for fruit shipments than were required.

During the month the Okanogan irrigation district paid the service for operation and maintenance and construction charges approximately \$31,400—W. D. Funk.

YAKIMA PROJECT, WASHINGTON.

The temperature for January was about normal.

Granger irrigation district.—The plant for manufacture of concrete lock-joint pipe for the siphon was completed and work started on making up reinforcement cages. Final location of the siphon was completed and survey of the lateral system begun.

Sunnyside Division.—Maintenance work consisted of completion of cleaning of canals and laterals, gravel riprapping, grubbing of willows, repair of telephone lines, and overhauling of pumping plants. Two structure crews were employed on repairs and replacements of canal structures.

Tieton Division.—Maintenance work consisted of a small amount of minor repairs on main lateral struc-

Crop report, Sunnyside division, Yakima project, Washington, 1922.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay.....	37,176	Ton.....	148,919	4.0	\$13.50	\$2,010,407	\$54.07
Apples.....	10,203	Pound.....	76,446,045	7,492.5	.02	1,528,922	149.85
Barley.....	434	Bushel.....	11,260	25.9	.60	6,756	15.57
Beans.....	206	do.....	5,401	26.2	3.15	17,013	82.59
Beets, sugar.....	927	Ton.....	4,932	5.3	6.00	29,592	31.92
Cantaloupes.....	913	Crate.....	89,930	98.5	.50	44,985	49.25
Corn:							
Indian.....	4,321	Bushel.....	190,073	44.0	.70	133,051	30.79
Fodder.....	150	Ton.....	563	3.8	5.00	2,815	18.77
Ensilage.....	445	do.....	8,750	19.7	6.00	52,500	117.97
Fruits, small.....	610	Pound.....	4,870,000	7,984	.032	183,000	300.00
Garden.....	1,271	Acre.....			200.00	254,200	200.00
Hay, other than alfalfa.....	872	Ton.....	1,148	1.3	14.00	16,072	18.43
Hops.....	135	Pound.....	198,500	1,470.4	.15	29,775	220.55
Oats.....	282	Bushel.....	13,494	47.8	.61	8,231	29.19
Onions.....	55	do.....	3,702	67.3	.50	1,851	33.65
Pasture.....	6,558	Acre.....			21.00	137,718	21.00
Peaches.....	908	Pound.....	13,487,000	14,853.5	.02	269,740	297.07
Pears.....	1,541	do.....	10,702,000	6,944.8	.021	240,795	156.26
Prunes.....	384	do.....	3,810,000	9,921.9	.02	76,200	198.43
Potatoes:							
White.....	9,544	Bushel.....	2,552,319	267.4	.35	893,311	93.60
Sweet.....	209	do.....	42,530	203.5	1.00	42,530	203.49
Rutabagas.....	607	do.....	176,880	291.4	.25	44,220	72.85
Rye.....	44	do.....	736	16.7	.80	589	13.38
Wheat.....	4,561	do.....	160,275	35.1	.97	155,467	34.08
Miscellaneous ¹	651	Acre.....			200.00	130,200	200.00
Less duplicated areas.....	2,247						
Total cropped.....	80,760		Total and average.....			6,309,920	78.13
Nonbearing orchard.....	1,264						
Young alfalfa.....	1,935						
Ground, fall plowed.....	1,016						
House and corral.....	3,307						
Townsite area.....	1,950						
Irrigation without crop.....	5,817						
Less duplicated areas.....	1,049						
Total irrigated.....	95,000						
			Areas.		Acres.	Farms.	Per cent of project.
			Total irrigable area farms reported.....		96,033	3,138	89.25
			Total irrigated area farms reported.....		95,000	3,138	88.29
			Under water right applications.....		32,310	1,029	30.03
			Under rental contracts.....		62,690	2,109	58.26
			Total cropped area farms reported.....		80,760	3,138	75.06

¹ Tomatoes, asparagus, and other truck crops not listed.

tures, cutting and grubbing of willows on main and sublaterals, repair of telephone lines, and betterment work on sub-laterals which included the installation of 240 feet of 8-inch concrete pipe, and 1,200 feet of 10-inch and 12-inch wood and concrete pipe, to replace wood flumes.

Contract dated September 29, 1922, for sale of water to Zillah Irrigation district (108.12 acres in and adjacent to town of Zillah on the Sunnyside Division) was executed by the Assistant Secretary of the Interior on January 3. Contract with the Granger Irrigation district, dated November 20, 1922, providing for construction of irrigation works and sale of water supply for approximately 1,600 acres within the district, was executed by the Assistant Secretary of the Interior on January 25.—*J. L. Lytel.*

TIETON DAM.

During January the precipitation was 12 inches, or approximately two-thirds of the entire precipitation for 1922. The early part of the month was mild, but the latter part was very cold. The road between Naches and Rimrock remained open to motor traffic. The average force employed for the month was 340 men.

Steam and electric shovels were overhauled and started on the spillway excavation. Solid rock excavated was placed on the outer slopes of the dam. Material unsuitable for this purpose was wasted.

Reservoir clearing continued with the cutting and piling of timber and brush. Twelve tracts of clearing, averaging 30 acres each, were let on contracts to small outfits consisting of two or three men. Satisfactory progress was made on these contracts.—*F. T. Crouce.*

RIVERTON PROJECT, WYOMING.

The roads were in excellent condition throughout January. Weather conditions were unusually favorable for construction. The force employed was increased during the month about 65 per cent.

On the Wind River Diversion Dam draglines 121474 and 121322 excavated 4,793 cubic yards of gravel and 51 cubic yards of sandstone for the weir, collected and screened gravel for concrete, and loaded 7,913 cubic yards of cobblestones on wagons for the dike. This material was hauled to the dike by 3-yard dump wagons and tractors. Five hundred and thirty-eight cubic yards of plain concrete and 983 cubic yards of reinforced concrete were placed during the month. The weir and fore apron were completed, except for about 40 feet. Four of the seven bridge piers were completed.

On the First Division of the Wyoming Canal the team excavation for the culvert at station 30, amounting to 2,850 cubic yards, was completed. Trimming was in progress for the lined section of the canal from station 0 to station 13 and 430 square yards of sandstone were trimmed.—*H. D. Comstock.*

SHOSHONE PROJECT, WYOMING.

January was an unusually pleasant month; temperatures were much above normal. Roads were in good condition and about the only class of work not possible was excavation in wet ground.

Good progress was made in the concrete work at the Willwood Dam, about 6,000 cubic yards of material having been placed. Owing to this good progress a class 14 electric dragline was moved to the river bottom near the end of the month, to construct cofferdams for turning the river flow and to begin the

Crop report, Tieton division, Yakima project, Washington, 1922.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average (per acre.)	Per unit of yield.	Total.	Per acre.
Alfalfa hay.....	11,300	Tons.....	34,183	3.0	\$10.00	\$341,830	\$30.25
Apples.....	7,180	Pounds.....	70,708,275	9,850.0	.0225	1,560,939	221.60
Barley.....	529	Bushels.....	10,730	20.3	.70	7,511	14.20
Beans.....	248	do.....	5,333	21.5	2.40	12,800	51.60
Beets, sugar.....	50	Tons.....	705	14.1	6.00	4,230	84.60
Corn.....	750	Bushels.....	30,926	41.2	.80	24,740	33.00
Corn ensilage.....	200	Tons.....	2,567	12.8	5.00	12,835	64.20
Corn fodder.....	■	do.....	161	3.1	3.00	483	8.00
Fruits, small.....	210	Pounds.....	702,360	3,345.0	.06	42,142	200.70
Garden.....	200	Acres.....	717	1.5	100.00	20,000	100.00
Hay, except above.....	470	Tons.....	717	1.5	8.00	5,736	12.20
Hops.....	222	Pounds.....	341,000	1,535.0	.10	34,100	153.60
Oats.....	228	Bushels.....	7,817	34.3	.55	4,300	18.85
Onions.....	76	do.....	11,380	150.0	.60	6,828	89.85
Pasture.....	1,830	Acres.....	■	■	15.00	27,450	15.00
Peaches.....	537	Pounds.....	3,328,860	6,185.0	.0225	74,832	139.35
Pears.....	1,573	do.....	7,158,600	4,550.0	.02	142,172	91.00
Potatoes.....	1,713	Bushels.....	339,825	198.0	.375	127,435	74.40
Wheat.....	2,052	do.....	47,467	23.1	1.00	47,467	23.15
Less duplicated areas.....	3,020						
Total cropped.....	26,400	Total and average.....				2,523,830	95.80
Young orchard.....	3,190						
Young alfalfa.....	500						
Irrigated without crop.....	80						
Building sites and miscellaneous.....	520						
Less duplicated areas.....	1,870						
Total irrigated.....	23,700						
		Areas.....			Acres.....	Farms.....	Per cent of projects.
		Total irrigable area farms reported.....			31,150	1,300	97.3
		Total irrigated area farms reported.....			28,700	1,300	89.7
		Under water right applications.....			28,700	1,300	89.7
		Total cropped area farms reported.....			26,400	1,300	82.5

work of excavating that portion of the foundation not yet unwatered. This machine worked from the 1st to the 18th on main canal excavation, moving 10,900 cubic yards of class 3 and 1,500 cubic yards of class 1 material. From the 18th to the 24th the machine was engaged on stripping the gravel pit at the dam.

The contractor for the Willwood Bridge shipped this structure in at the beginning of the month and worked on its erection. At the close of the month the work was nearly completed. A class 9½ gasoline dragline was moved to the approaches of the bridge, and during the week January 19 to 25 built a portion of the north approach, the work consisting of both excavation and embankment work.

Crop movements were only moderate; the principal commodity moving was hay. The alfalfa mill at Powell was in operation the entire month.

Operation and maintenance work in progress was inspection of drains on the Garland Division, repair of a few trap boxes on closed drains, and the removal of three obstructions at various locations on the closed-drain system.

The power plant at Shoshone Dam was operated without interruption; 200,200 kilowatt hours were generated, of which 17,100 kilowatt hours were delivered to the town of Powell and 102,090 kilowatt hours were delivered to Government construction features, mainly at the Willwood Dam.—*J. S. Longwell.*

INDIAN PROJECTS, MONTANA.

BLACKFEET PROJECT.

The weather during January was rather mild, except for the last few days.

The field force consisted of two men, one water master and one camp man, who were working on repairs to buildings and equipment and other routine work. The office work consisted of work in connection with monthly and annual reports.—*H. L. Scott.*

FLATHEAD PROJECT.

January weather conditions were excellent. Plowing was general in the early part.

Excavation of the foundation for Hubbard Dam was continued and the excavation of all loose material completed. A crevice 30 feet deep was uncovered at Station 3+50 having a top width of 35 feet and bottom width of 1 foot. This will make the maximum height of dam 131 feet. The first concrete was poured to fill this crevice on January 28. Cutting of wood and trestle timbers and hauling of materials and supplies was in progress.

On the Tabor Feed Canal the steam shovel advanced 2,570 feet and completed the canal to Station 166+30; 19,429 cubic yards of all classes of material were excavated. Clearing was completed to Station 200. One hundred and ninety-three ricks of steam shovel wood were cut during the month. All operation and maintenance camps were closed or in charge of caretakers. The field party made survey of lateral extensions on the Mission Valley Division.

Baled alfalfa found a steady market at prices from \$14 to \$16 per ton. A midwinter fair was held at Polson on January 25-27 and was declared to be a great success. This fair will be held in October in following years. Exhibits of vegetables, grains, seeds, and poultry were the principal features.

Some activity was reported in obtaining renters on irrigable farm units from nonirrigated sections of Montana. A party of prospective land buyers from the Snake River Valley visited the Mission Valley

during the month and expected to return soon to locate permanently.

The water users of the Post subdivision were actively engaged in promoting the formation of an irrigation district to include 30,000 acres in the Moiese Valley and about Charlo.

The water users' association of the Little Bitter-root Valley voted to erect a community hall at Lonepine to be 40 feet by 80 feet, and to be used for community meetings and for the exhibition hall for their annual fairs.—*C. J. Moody.*

FORT PECK PROJECT.

Mild weather prevailed during the greater part of January with little precipitation. The roads remained in good shape for sleighing during the entire month and permitted the hauling of a large portion of last year's grain crop.

Office work consisted of preparation of general reports and a number of special reports.

About two-thirds of last year's grain crop had been marketed with a continued hauling of this crop. Prices were considered fair.

All live stock was being fed and their condition was generally good.—*E. L. Decker.*

GENERAL OFFICES.

Washington office.—Director Davis was in charge of the office the entire month, except for a few days in New York attending meetings of the American Society of Civil Engineers. During his absence the office was in charge of Assistant Director Morris Bien as acting director. Mr. Bien was away from the office on January 13 attending a meeting in Chicago of the executive committee of the American Association of Engineers.

Chief Counsel Hamele was in the office the entire month.

During the month extensive hearings were held by the House Committee on Irrigation of Arid Lands on S. 4187, to extend the time of payment of charges due on reclamation projects. The director and Project Managers Weiss, Richardson, and Dibble appeared before the committee. These three project managers also attended the meetings of agriculturists from the projects, called by Mr. C. S. Scofield, of the Department of Agriculture.

Publications issued during the month comprised 126 copies of the annual reports and 260 miscellaneous publications. The 27 mimeograph jobs amounted to a total run of 21,755 sheets.

The number of inquiries concerning the service and opportunities for settlement answered by the settlement and information section amounted to 451. At the end of the month the total number of inquiries from ex-service men concerning opportunities on the land totaled 195,885.

The photographic laboratory turned out work during the month to the value of \$527.75, distributed as follows: Washington office, \$61.70; field, \$302.40; sales, \$163.65.

Denver office.—The chief engineer was in the Denver office until January 20, when he left for Washington, D. C. Assistant Chief Engineer R. F. Walter left Denver on January 5 for the Belle Fourche and North Platte projects, returning on the 13th. Engineer James Munn returned from Santo Domingo on January 12. On January 28 Messrs. Walter and Munn left for Salt Lake City to attend a conference of representatives of water users' organizations of the various projects, returning on February 1.

The principal work accomplished in the designing section consisted of the following: Made studies of Wheeler type of dam with relation to its use at American Falls and elsewhere; completed preliminary designs and estimates for 12 different plans for Thief Valley Dam and designs and estimates for siphons in North and South Canals, Baker project; prepared and checked various designs in connection with Black Canyon Dam, Boise project; revised designs of Hubbard Dam to adapt location of outlet works and spillway section to foundation conditions disclosed by excavation, Flathead project; completed detail design for operating house for sluice gates, Orchard Mesa Siphon and design for concrete flume, Grand Valley project; started preliminary designs and estimate of 5,000 second-feet main canal, siphons, tunnels, etc., through 30 miles of difficult location on proposed Mountain Home project; completed revision of preliminary design and estimate for a multiple arched dam, Orland project; prepared preliminary designs and estimates for siphon, culvert, and cross drainage culvert on Fort Laramie Canal, North Platte project; completed final design for 20-foot concrete inverted siphon on Wyoming Canal at Dry Creek, Riverton project; prepared new estimates for outlet works and spillways for proposed dams, Salt Lake Basin secondary investigations; prepared detail designs for sand trap and sluice, Snells Canyon, on power canal, Strawberry Valley project; prepared detail design for intake structure and Venturi meter for Granger Siphon, Yakima project; and made studies of core wall data and pressures, Yakima storage.

The principal work accomplished in the electrical section consisted of the following: Drawings were completed, specifications issued, and bids received for a combined radial and thrust bearing for No. 1 direct pumping unit, King Hill project. Tracings were completed and blue prints forwarded to the project for spillway, drop and pump discharge outlet for pumping plant No. 2. Orders were placed for a new turbine and new pump for No. 2 direct pumping plant. Specifications for machinery for the proposed 1,600-kilowatt plant and also for a 750-kilowatt temporary plant at Riverton were completed. Specifications for hydraulic turbine and alternating-current generator for the 7th unit, Roosevelt power house, Salt River project, submitted by Mr. Cragin, were examined. Mechanical parts for the electrification of a dragline on the Shoshone project were ordered from the Bucyrus company. Motors and miscellaneous material for the Class 14 machine were purchased, and designs partially completed for the motor-driven swing machinery for this excavator. Advertisements were issued for materials for extensions of the transmission lines necessary to deliver power to the dragline excavators on the Willwood, Garland, and Frannie Divisions. Preliminary designs were prepared for 8-inch automatic air valves for outlet pipes and design of steel outlet pipes for Tieton Dam was studied. On the Yuma project detail design and tracing was made of the switchboard grillages for the Yuma Valley pumping plant. The design of the 33,000-volt transmission line from B Lift to Valley Drainage plant was revised to reduce the sag. A preliminary estimate was prepared covering a 14,500-kilowatt hydroelectric plant on the south side of the Platte River, in connection with report on Lower Platte secondary investigations.

The more important matters considered by the legal section were: The question of cooperation of the

Federal Real Estate Board with the National Association of Real Estate Boards in the matter of an appraisal of lands which will be required as right of way for the proposed Spanish Springs Reservoir, Newlands project; payment of project charges on behalf of bankrupt estate of Allan T. Semb, Lower Yellowstone project; proposed lease of Tule Lake lands as a result of recommendation in recent board report, Klamath project; and removal of dam constructed by private persons across Old River Drain, Newlands project. The more important forms of contracts considered, prepared, or transmitted were: Report regarding standardization of Government contracts, with criticisms and suggestions relative to tentative forms prepared by the Bureau of the Budget; contract with Granger irrigation district for construction works and furnishing water, Yakima project, and with the Prosser irrigation district, amending schedule of payments under previous contract, Yakima project; contract with Nampa and Meridian irrigation district regarding payment by district of operation and maintenance charges, pending decision of suit between United States and district now on appeal, Boise project; and draft of proposed supplemental contract with King Hill irrigation district.

Summary of employees for January, 1923.

Projects and offices.	Beginning of month.	End of month.	Increase.	Decrease.
Washington office.....	77	76		1
Denver office.....	58	60	2	
Federal legal.....	17	17		
Examiners of accounts.....	2	2		
Yuma.....	148	194	36	
Yuma auxiliary.....	35	55	20	
Orland.....	75	71		4
Grand Valley.....	91	114	23	
Uncompahgre.....	60	150	90	
Boise.....	59	75	16	
King Hill.....	269	226		43
Minidoka.....	53	56	3	
Huntley.....	13	11		2
Lower Yellowstone.....	15	15		
Milk River.....	36	31		5
St. Mary Storage (includes half time of 7 on Blackfeet).	9	9		
Sun River.....	47	62	15	
North Platte.....	354	349		5
Newlands.....	107	128	21	
Carlsbad.....	17	54	37	
Rio Grande.....	530	678	148	
North Dakota pumping.....	24	24		
Baker.....	18	6		12
Klamath.....	109	98		11
Umatilla.....	30	30		
Belle Fourche.....	10	12	2	
Strawberry Valley.....	18	18		
Okanogan.....	10	7		3
Yakima.....	118	149	31	
Tieton dam.....	337	345	8	
Riverton.....	144	239	95	
Shoshone.....	240	258	18	
Secondary.....	64	68	4	
Unassigned per diem.....	26	26		
INDIAN.				
Flathead.....	98	100	2	
Fort Peck.....	6	6		
Blackfeet (exclusive of half time of 6 on St. Mary).....	2	2		
Total.....	3,326	3,809	571	88
Net increase.....			483	

¹ Exclusive of 3 in Denver.

ADMINISTRATIVE ORGANIZATION.

DEPARTMENT OF THE INTERIOR.

Hon. HUBERT WORK, Secretary of the Interior.
EDWARD C. FINNEY, First Assistant Secretary.
FRANCIS M. GOODWIN, Assistant Secretary.
EDWIN S. BOOTH, Solicitor for the Interior Department.
CHARLES V. SAFFORD, Administrative Assistant to the Secretary.
MORGAN R. BROCK, Assistant to the Secretary.
JOHN HARVEY, Chief Clerk and Superintendent of Buildings.

U. S. RECLAMATION SERVICE.

WASHINGTON, D. C.

Arthur Powell Davis, director; **Morris Bien**, assistant director; **Ottomar Hamel**, chief counsel; **J. B. Beadle**, director's assistant; **C. J. Blanchard**, statistician; **Hugh A. Brown**, editor and office assistant; **C. A. Bissell**, engineer; **J. M. Luney**, chief accountant; **C. A. Lyman**, repayment accounting; **Miss H. A. Fellows** and **Raymond Depue**, fiscal agents; **C. H. Fitch**, chief clerk; **Emmet Carr**, purchasing agent; **G. W. Numbers**, appointment clerk; **H. N. Bickel**, Yakima, Wash., and **W. F. Kubach**, Denver, Colo., examiners of accounts.

DENVER, COLO.

F. E. Weymouth, chief engineer, Wilda Building, Denver, Colo.; **R. F. Walter** and **C. P. Williams**, assistant chief engineers; **Miss L. H. Meisel**, secretary to the chief engineer; **J. M. Gaylord**, electrical engineer; **J. L. Savage**, designing engineer; **James Munn**, engineer; **W. A. Meyer**, chief clerk; **A. McD. Brooks**, purchasing agent; **Harry Caden**, fiscal agent.

FIELD LEGAL OFFICES.

Boise, Idaho.—**B. E. Stoutemyer**, district counsel. Projects: Boise, Minidoka, King Hill, and Jackson Lake Enlargement.

Denver, Colo.—Law section office of chief engineer: **R. M. Patrick** and **Armand Offutt**, district counsel.

Las Cruces, N. Mex.—**Mark B. Thompson**, attorney. Projects: Rio Grande, Carlsbad, and Hondo.

Helena, Mont.—**E. E. Roddis**, district counsel, Helena, Mont. Projects: Blackfoot, Flathead, Fort Peck, Huntley, Milk River, St. Mary Storage, Sun River, North Dakota Pumping, Lower Yellowstone, and Shoshone.

Mitchell, Nebr.—**J. N. Beardslee**, district counsel. Projects: North Platte, Belle Fourche, and Riverton.

Montrose, Colo.—**J. R. Alexander**, district counsel. Projects: Grand Valley, Uncompahgre, and Strawberry Valley.

Portland, Oreg.—**H. L. Holgate** and **D. G. Tyree**, district counsel. Projects: Yakima, Okanogan, Umatilla, Klamath, and Baker.

San Francisco, Calif.—**P. W. Dent** and **Brooks Fullerton**, district counsel, 349 Pacific Building. Projects: Salt River, Yuma, Orland, and Nevada.

PROJECT ORGANIZATION.

Belle Fourche Project.—**B. E. Hayden**, project manager, Newell, S. Dak.; **R. C. Walber**, chief clerk.

Boise Project.—**J. B. Bond**, project manager, Boise, Idaho; **Walter Ward**, engineer in charge construction Black Canyon Dam; **E. R. Mills**, chief clerk; **C. F. Weinkauff**, fiscal agent.

Carlsbad Project.—**L. E. Foster**, project manager, Carlsbad, N. Mex.; **V. L. Minter**, chief clerk and fiscal agent.

Grand Valley Project.—**S. O. Harper**, project manager, Grand Junction, Colo.; **W. J. Chiesman**, chief clerk; **A. H. Hall**, fiscal agent.

Huntley Project.—**A. R. McGinness**, project manager, Ballantine, Mont.; **G. H. Bolt**, chief clerk; **Miss M. C. Simek**, fiscal agent.

King Hill Project.—**A. M. Rawns**, project manager, King Hill, Idaho; **T. W. Hause**, chief clerk; **W. S. Gillogly**, fiscal agent.

Klamath Project.—**H. D. Newell**, project manager, Klamath Falls, Oreg.; **N. G. Wheeler**, chief clerk; **G. R. Barnhart**, fiscal agent.

Lower Yellowstone Project.—**L. H. Mitchell**, project manager, Savage, Mont.; **E. R. Sheppellmann**, chief clerk.

Milk River Project.—**G. E. Stratton**, project manager, Malta, Mont.; **H. A. Parker**, engineer; **E. E. Chabot**, chief clerk; **G. S. Moore**, fiscal agent.

Minidoka Project.—**Barry Dibble**, project manager, Burley, Idaho; **Dana Templin**, engineer; **E. C. Diehl**, chief clerk; **Miss A. J. Larson**, fiscal agent; **F. A. Banks**, engineer, American Falls, Idaho.

Newlands Project.—**J. F. Richardson**, project manager, Fallon, Nev.; **A. W. Walker**, engineer; **G. B. Snow**, chief clerk; **Miss Ethel M. Simmonds**, fiscal agent.

North Dakota Pumping Project.—**W. S. Arthur**, project manager and chief clerk, Williston, N. Dak.; **H. C. Melas**, fiscal agent.

North Platte Project.—**Andrew Weiss**, project manager, Mitchell, Nebr.; **H. W. Bashore**, engineer, Fort Laramie Division; **J. R. Ummel**, chief clerk; **Mrs. A. L. Truax**, fiscal agent.

Okanogan Project.—**Calvin Casteel**, project manager, Okanogan, Wash.; **W. D. Funk**, chief clerk and fiscal agent.

Orland Project.—**R. C. E. Weber**, project manager, Orland, Calif.; **E. T. Eriksen**, engineer; **C. H. Lillingston**, chief clerk and fiscal agent.

Rio Grande Project.—**L. M. Lawson**, project manager, El Paso, Tex.; **T. W. Parry**, irrigation manager; **C. A. Peavey**, chief clerk; **L. S. Kennicott**, fiscal agent.

Riverton Project.—**H. D. Comstock**, project manager, Riverton, Wyo.; **R. M. Conner**, engineer; **G. H. Murphy**, chief clerk; **W. J. Fogarty**, fiscal agent.

St. Mary Storage Division.—**R. M. Snell**, project manager, Brown, Mont.; **F. H. Shiner**, chief clerk and fiscal agent.

Salt River Project.—Being operated by the Salt River Valley Water Users' Association; **C. C. Cragin**, general superintendent and chief engineer, Phoenix, Ariz.

Shoshone Project.—**J. S. Longwell**, project manager, Powell, Wyo.; **J. R. Iakisch**, engineer; **C. M. Jump**, superintendent of irrigation; **W. F. Sha**, chief clerk; **Miss L. C. Drinkwater**, fiscal agent.

Strawberry Valley Project.—**W. L. Whittemore**, project manager, Provo, Utah; **J. E. Overlade**, chief clerk and fiscal agent.

Sun River Project.—**G. O. Sanford**, project manager, Great Falls, Mont.; **H. W. Johnson**, chief clerk; **G. A. Benjamin**, irrigation manager, Fairfield, Mont.

Umatilla Project.—**H. M. Schilling**, project manager, Hermiston, Oreg.; **G. C. Patterson**, chief clerk and fiscal agent.

Uncompahgre Project.—**L. J. Foster**, project manager, Montrose, Colo.; **R. B. Smith**, chief clerk; **F. D. Helm**, fiscal agent.

Yakima Project.—**J. L. Lytel**, project manager, Yakima, Wash.; **R. K. Cunningham**, chief clerk; **J. C. Gawler**, fiscal agent; **M. D. Scroggs**, superintendent of irrigation, Sunnyside, Wash.; **J. S. Moore**, superintendent of irrigation, Route 6, Yakima, Wash.; **F. T. Crowe**, engineer in charge construction Tieton Dam, Rimrock, Wash.; **C. F. Gleason** and **W. C. Christopher**, engineers; **V. G. Evans**, chief clerk; **C. B. Funk**, fiscal agent.

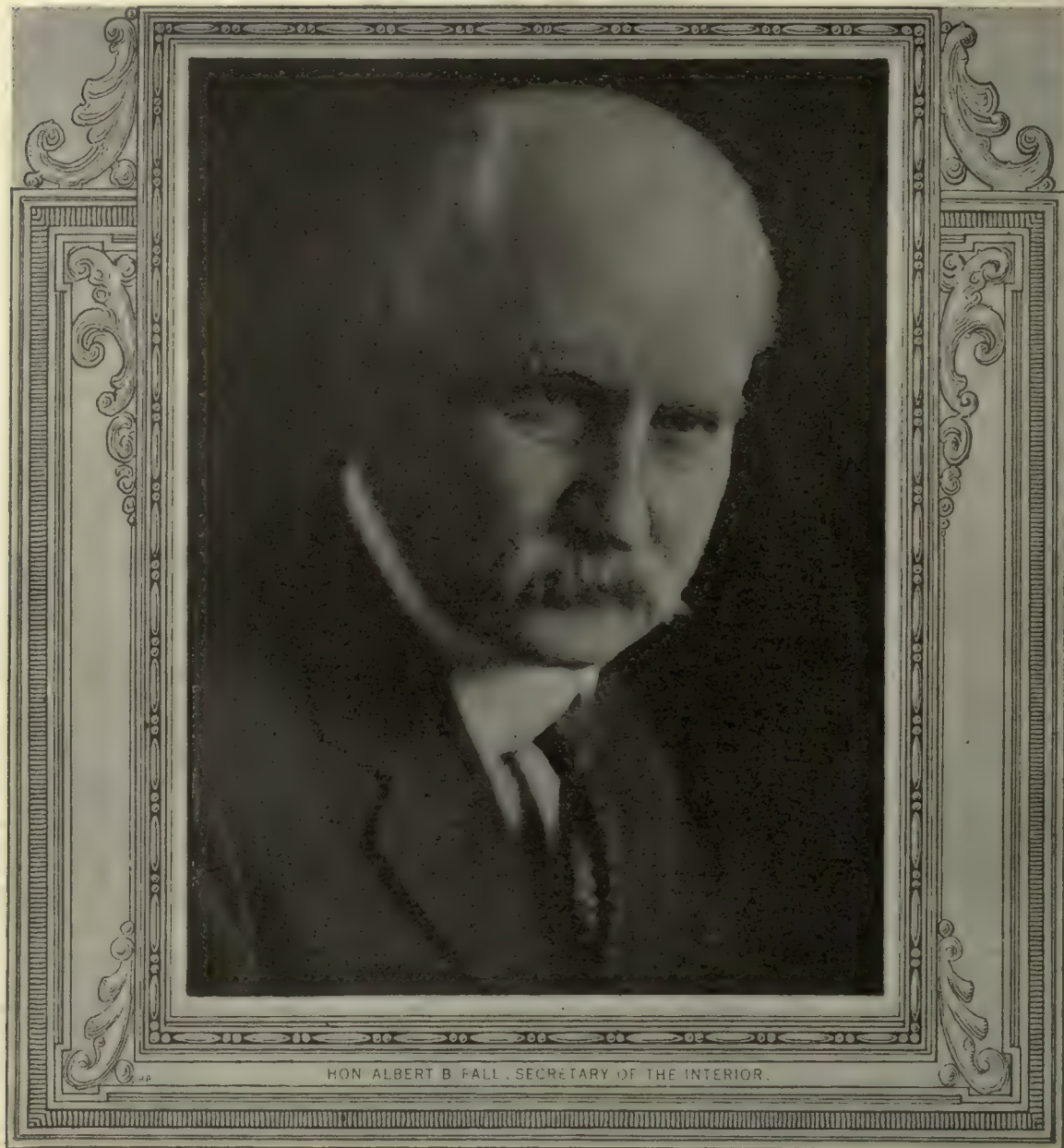
Yuma Project.—**P. J. Preston**, project manager, Yuma, Ariz.; **R. M. Priest**, superintendent of construction; **D. C. McConaughy**, engineer, Yuma Mesa Division; **C. A. Denman**, chief clerk; **E. M. Philebaum**, fiscal agent.

INDIAN PROJECTS.

Blackfoot Project.—**R. M. Snell**, project manager, Browning, Mont.; **F. H. Shiner**, chief clerk and fiscal agent.

Flathead Project.—**C. J. Moody**, project manager, St. Ignatius, Mont.; **S. A. Kerr**, engineer in charge construction Hubbard Dam; **J. M. Swan**, chief clerk; **J. P. Siebeneicher**, fiscal agent.

Fort Peck Project.—**E. L. Decker**, acting project manager, Poplar, Mont.; **Henry Berryhill**, chief clerk and fiscal agent.



HON. ALBERT B. FALL, RETIRING SECRETARY OF THE INTERIOR.

The resignation of Hon. Albert B. Fall, Secretary of the Interior, effective March 4, is generally regretted by the service and the project people. The problems of reclamation received his close personal attention throughout his two years in the Cabinet. Supplementing his broad knowledge of the subject by frequent visits to the projects and numerous meetings with the farmers he brought about more cordial relations between the Government and the settlers. His sympathetic understanding of the difficulties to be overcome in establishing homes in the desert won for him the esteem and confidence of the settlers, by whom he was regarded as a real friend. The two years of his administration were the most critical in the history of national irrigation by reason of the severe deflation in the prices of farm products, which brought many of the farmers to the verge of bankruptcy.

That the crisis is safely passed is due in a large measure to the intelligent and just application of measures of relief which he has extended from time to time to the deserving debtors of the Government.

On behalf of the service and the settlers on the projects the Record extends to Mr. Fall its best wishes for success and prosperity in his future undertakings.

The Reclamation Record

Issued Monthly by the RECLAMATION SERVICE, DEPARTMENT OF THE INTERIOR, Washington, D. C.

VOLUME 14, No. 3

Price: 75 cents per year

MARCH, 1923

TO THE FARMERS ON THE RECLAMATION PROJECTS AND THE EMPLOYEES OF THE SERVICE.

UNDER the provisions of the reclamation act the relations of the Secretary of the Interior to your activities and your duties are peculiarly close and intimate. We are members of a great organization engaged in an important creative work. It is my earnest desire to exercise the duties imposed upon me in a manner which will promote the hearty cooperation of all who are devoting their lives to this task.

I know that the Nation owes much to the pioneers who have wrested an empire from the western arid wastes, for I have lived among them. Their accomplishments have contributed largely to our national wealth and to the stability of our institutions, and their personality has broadened the vision of a people.

In so far as authority is granted me, I shall gladly extend the services and sympathy of this department in the problems looking toward their advancement.

HUBERT WORK,
Secretary of the Interior.

Secretary Work Outlines General Policies.

Statement Following Formal Induction into Office.

"For many years I have lived among the great domestic problems of the Nation that come within the province of the Department of the Interior, in the West, but have no financial interest in any of them. The natural resources of our country to-day are boundless in their scope and it is the duty of the Government and those officials intrusted with administrative authority to preserve with zealous care those rights of Government and the people with the same solicitude that might be exercised in purely personal obligations. The various bureaus and semi-independent agencies coordinated in the Department of the Interior exercise an influence of tremendous magnitude upon our national life. Our public-land problem, including reclamation and irrigation, deal with the prosperity of millions of our citizens throughout the western part of the country, and they are perhaps not always fully understood or appreciated in the East; nevertheless they are fundamentally the problems of all Americans.

"I have no plans for the establishment of perfectly balanced governmental institutions or any formula for the inauguration of the millennium among the workers of this department. But I do sense the complexity of the problems confronting Government to-day and feel, perhaps with a justifiable sincerity, that the problems of to-morrow will be more complex and require more ingenuity and energy if we are to attain substantial progress.

"I believe that the work done and the questions confronting Government should be placed frankly before the American people. The American Government should advertise with energy to the end that its millions of citizens of every class may enjoy a better understanding of the functions of Government, what they stand for and what they seek to accomplish in the interest of the public. Education of the proper kind is the most powerful agency known to civilization, and, combined with honesty and fidelity of purpose, will make for better Americans

and a better America. So, in the conduct of the Department of the Interior, there shall be no submerged or camouflaged policies, no issues tucked away, but an open and frank exposition of all actions deemed essential to the public interest.

"The same strictly business methods that prevailed in the Post Office Department during my incumbency as Postmaster General will be applied to the De-

partment of the Interior to the end that its functions may be exercised with the efficiency that characterized the administration of my distinguished predecessor, Secretary Fall. I will continue the 'open-door policy' in this department adopted at the Post Office Department, so that the public may look in, if it wishes, to see its own business transacted."

RECLAMATION LAW NOTES.

By Ottamar Hamel, Chief Counsel, U. S. R. S.

Relief Act of February 28, 1923, and Regulations Thereunder.

THE following is the text of Reclamation Service Circular Letter No. 1197, approved by Secretary Work on March 7, 1923, which circular letter contains the text of the relief law for water users under Federal irrigation projects, as found in the relief act of March 31, 1922 (42 Stat. 489) and the relief act of February 28, 1923 (42 Stat. —), together with the regulations thereunder:

C. L. 1197, 1923.

DEPARTMENT OF THE INTERIOR,
UNITED STATES RECLAMATION SERVICE,
Washington, D. C., March 7, 1923.

From: Director.

To: All field offices.

Subject: Regulations under the relief act of February 28, 1923 (Public No. 454, 42 Stat. —), which amends the relief act of March 31, 1922 (42 Stat. 489). See C. L. 1100.

TEXT OF THE RELIEF LAW.

1. The relief act of March 31, 1922 (42 Stat. 489), reads as follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That where an individual water user or individual applicant for a water right under a Federal irrigation project constructed under the act of June 17, 1902 (Thirty-second Statutes, page 388), or any act amendatory thereof or supplementary thereto, is unable to pay any construction charge due and payable in the year 1922 or prior thereto, the Secretary of the Interior is hereby authorized, in his discretion, to extend the date of payment of any such charge for a period not to exceed one year from December 31, 1922: *Provided,* That the applicant for the extension shall first show to the satisfaction of the Secretary of the Interior by a detailed verified statement of his assets and liabilities, an actual inability to make payment at the time the application is made and an apparent ability to meet the deferred charge when the extension expires; also in cases where water for irrigation is available, that the applicant is a landowner or entryman whose land against which the charge has accrued is being actually cultivated: *Provided further,* That similar relief in whole or in part may be extended by the Secretary of the Interior to a

legally organized group of water users of a project, upon presentation of a sufficient number of individual showings made in accordance with the foregoing proviso to satisfy the Secretary of the Interior that such extension is necessary: *And provided further,* That each charge so extended shall draw interest at the rate of 6 per centum per annum from its due date in lieu of any penalty that may now be provided by law, but in case such charge is not paid at the end of such extension period, any penalty that would have been applicable save for such extension, shall attach from the date the charge was originally due the same as if no extension had been granted.

SEC. 2. That the Secretary of the Interior is hereby authorized, in his discretion, after due investigation, to furnish irrigation water on Federal irrigation projects during the irrigation season of 1922 to landowners or entrymen who are in arrears for more than one calendar year in the payment of any operation and maintenance or construction charges, notwithstanding the provisions of section 6 of the act of August 13, 1914 (Thirty-eighth Statutes, page 686): *Provided,* That nothing in this section shall be construed to relieve any beneficiary hereunder from payments due or penalties thereon required by said act: *Provided further,* That the relief provided by this section shall be extended only to a landowner or entryman whose land against which the charges have accrued is actually being cultivated.

2. The relief act of February 28, 1923 (Public No. 454, 42 Stat. —), reads as follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section 1 of the act entitled "An act to authorize the Secretary of the Interior to extend the time for payment of charges due on reclamation projects, and for other purposes," approved March 31, 1922, is amended by striking out the words "one year" where they appear in such section and inserting in lieu thereof the words "two years."

SEC. 2. That the Secretary of the Interior is authorized, in the manner and subject to the conditions imposed by such act of March 31, 1922, to extend for a period not exceeding two years from December 31, 1922, the date of any payment of any charge the date of payment of which has been extended under the provisions of section 1 of such act.

SEC. 3. That every charge, the date of payment of which is extended under the provisions of section 2 of this act, shall draw interest at the rate of 6 per

centum per annum from the date from which it was so extended in lieu of any penalty that may now be provided by law, but in case such charge is not paid at the end of the period for which it is so extended any such penalty shall attach from the date the charge was originally due, as if no extension had been granted.

SEC. 4. That section 2 of such act of March 31, 1922, is amended by striking out the words "season of 1922" where they appear in such section and by inserting in lieu thereof the words "seasons of 1922 and 1923."

SEC. 5. That where an individual water user, or individual applicant for a water right under a Federal irrigation project constructed or being constructed under the act of June 17, 1902 (Thirty-second Statutes at Large, page 388), or any act amendatory thereof or supplementary thereto, is unable to pay any construction or operation and maintenance charge due excepting operation and maintenance charges for drainage on the Boise project, Idaho, for the year 1922, or prior thereto, the Secretary of the Interior is hereby authorized in his discretion to add such accrued and unpaid charges to the construction charge of the land of such water user or applicant, and to distribute such accumulated charges equally over each of the subsequent years, beginning with the year 1924, at such rate per year as will complete the payment during the remaining years of the twenty-year period of payment of the original construction charge: *Provided*, That upon such adjustment being made, any penalties or interest which may have accrued in connection with such unpaid construction and operation and maintenance charges shall be canceled, and in lieu thereof the amount so due, and the payment of which is hereby extended, shall draw interest at the rate of 6 per centum per annum, paid annually from the time said amount became due to date of payment: *Provided further*, That the applicant for the extension shall first show to the satisfaction of the Secretary of the Interior detailed statement of his assets and liabilities and actual inability to make payment at the time of the application and an apparent ability to meet the deferred charges in 1924 and subsequent years: *And provided further*, That in case the principal and interest herein provided for are not paid in the manner and at the time provided by this act, any penalty now provided by law shall attach from the date the charge was originally due: *And provided further*, That similar relief in whole or in part may be extended by the Secretary of the Interior to a legally organized group of water users of a project, upon presentation of a sufficient number of individual showings made in accordance with the foregoing proviso to satisfy the Secretary of the Interior that such extension is necessary.

SCOPE OF THE RELIEF LAW.

3. The two acts will together be referred to as the relief law. This law applies to all Federal irrigation projects constructed or being constructed under the reclamation law, including the Mesa division of the Yuma project in Arizona, but does not apply to projects being constructed by the Reclamation Service for the Bureau of Indian Affairs. It is temporary legislation necessitated by conditions on some projects, and permits three classes of relief, to wit: (a) Extension of time of payment of construction charges due in 1922 or prior thereto to any date not beyond December 31, 1924; (b) the furnishing of

irrigation water during the season of 1923 notwithstanding a delinquency of more than one year in the payment of any operation and maintenance or construction charges; and (c) the distribution of accrued operation and maintenance and construction charges for the year 1922 and prior thereto, over the period covered by the remaining construction installments, in those cases where the water users are unable to pay such accrued charges on or before December 31, 1924. A specific exception is made as to operation and maintenance drainage charges on the Boise project under public notice dated February 15, 1921.

GENERAL POLICY OF THE UNITED STATES.

4. The continuance of the present Federal reclamation plan is dependent upon the collection of water charges under the liberal terms of the reclamation law. Good policy and good faith both require that so far as possible repayments to the Government be not unreasonably postponed. Those water users who have credits and assets making it reasonably possible for them to pay all or part of their obligations due the United States will be expected to do so. At the same time, this measure will be applied sympathetically for the benefit of those not now able to pay, but who are exerting themselves to reclaim their lands and to carry out their contracts with the United States, and who, with the relief authorized by this law, may be expected to become successful farmers. The experience of the Reclamation Service has demonstrated that great individual industry on our projects is not always rewarded with success, and that even the hardest of labor and the closest of application will not overcome a defective plan of farming. Applicants for relief will therefore be required to show the plan of farming they are following and if the plan is defective, they will be advised to change it, and the nature of the relief given will depend largely upon their cooperation in this matter. The law does not contemplate the indiscriminate granting of relief, but care will be used to treat fairly all deserving cases. The question of leniency will be considered from a practical business standpoint and for the best interests both of the Government and of the water users.

DELIVERY OF WATER IN 1923.

5. Section 6 of the act of August 13, 1914 (38 Stat. 686), provides that no water shall be delivered to the lands of any water-right applicant or entryman who shall be in arrears for more than one calendar year in the payment of any reclamation charges, and the effect of section 4 of the relief act of February 28, 1923, is to authorize the Secretary of the Interior, in his discretion, to waive such inhibition for the year 1923. In other words, during the season of 1923 the Secretary is authorized, in his discretion, to furnish water to those in arrears for more than one calendar

year as defined by Departmental Decision of May 24, 1916 (C. L. 564). No extension of time in payment is provided for under this section, and the penalties for nonpayment, as recited in the reclamation law, continue to run until the sum or sums due are paid.

SHORT EXTENSION OF CHARGES.

6. Under sections 1, 2, and 3 of the relief act of February 28, 1923, the Secretary is authorized, in his discretion, and under the conditions and limitations set forth below, to extend the date or dates of payment of all or a portion of the construction charges due in 1922 or prior years. Under these sections no such charge can be extended beyond December 31, 1924, and all such charges extended will draw interest at the rate of 6 per cent per annum from the time they originally became due and payable. However, if unpaid at the end of the extension period, all penalties provided by the reclamation law will attach from the original due date or dates. Under the sections referred to in this paragraph, no extension can be made of any operation and maintenance charge of any year.

LONG EXTENSION OF CHARGES.

7. In a case where the relief described in paragraphs 5 and 6 hereof would be insufficient, the Secretary is authorized under section 5 of the relief act of February 28, 1923, in his discretion, to distribute the accrued and unpaid charges for 1922 and prior thereto, both on account of construction and of operation and maintenance, equally over each of the remaining construction installments. This is the only section of the relief law under which operation and maintenance charges may be extended. Such penalties as may have accrued upon the charges extended under this section will be canceled and all charges extended will draw interest at the rate of 6 per centum per annum, to be paid annually from the original due date to date of payment. It is important that all applicants for relief under this section have a clear understanding of the interest provision, for the reason that while the old penalties will be canceled when the extension is permitted, the delinquent charges will continue to draw interest at 6 per cent per annum until all of such delinquency has been paid. This section also provides that upon failure to pay any installment as extended or the interest thereon, all penalties as provided by the reclamation law will attach to such installment from the original due date. Operation and maintenance charges for drainage on the Boise project, Idaho, under public notice of February 15, 1921, are excluded from the benefits of this section.

WHO ARE QUALIFIED TO APPLY FOR RELIEF.

8. The liberal terms of the reclamation law are intended to provide homes for persons who live by farming, and only those whose lands are actually being cultivated are eligible to receive the benefits

of the relief law. This, however, does not mean that every irrigable acre of each farm must be cultivated, but that in a general way the farm must be under cultivation. As a general rule relief will not be granted to nonresidents of the vicinity and as to lands held in tenancy. An exception to the rule as to cultivation is made in the case of those lands in Part I of the Mesa division of the Yuma project in Arizona, for which water is not yet available; the construction charges against the Mesa division lands may be extended but not the purchase price for the lands. A further exception to the general rules as to residence and cultivation may also be proper where serious illness or death in a family or some other good reason has compelled some relaxing of effort on the part of the owner. Each application which relies upon such a claim should be carefully and personally investigated by the project manager and full report made thereon. The requirements of this paragraph apply to all three classes of relief.

WHO ARE ENTITLED TO RELIEF.

9. The Secretary is authorized to extend charges only upon a satisfactory showing by the applicant that he is actually unable to make payment at the time the application is made and that there is a reasonable likelihood of his being able to make payment when the extensions expire. Both elements must be present in order to satisfy the requirements of the relief law. In other words, relief may be given to an applicant who shows he is unable to now pay a past-due charge, only in the event of his being able to show a reasonable expectation of paying the charge at a later date. When the water user is much involved by reason of large financial obligations carrying heavy rates of interest, it will be difficult for him to make the necessary showing as to apparent ability to pay at a later date, unless the applicant's creditors will make some concessions by way of extensions of principal and reductions of interest, at least as to obligations past due. In all such cases the applicant should solicit the cooperation of his creditors, and the willingness of the creditors to make such extensions and reductions will be considered in determining the ability of the applicant to pay the water charges at a later date. Concessions made by a creditor must be in writing signed and acknowledged by the creditor. Where it appears from the showing made that there is a reasonable expectation that all delinquencies may be met on or before December 31, 1924, the relief described in paragraph 6 hereof will be appropriate. The longer extension described in paragraph 7 hereof will be granted only in those cases where the financial condition of the applicant, when considered in connection with the total amount then due, is such that he may not reasonably be expected to overcome his delinquency within the shorter period.

HOLDERS OF EXCESS LANDS.

10. Every effort should be made to reduce excess holdings within the limit of time established by the reclamation law for such reduction, and no relief will be given to a person who is holding for an unreasonable time an excess area in violation of the law.

SALE OF LAND THROUGH THE RECLAMATION SERVICE.

11. Each project manager is authorized to make available the services of the Reclamation Service, and the owner may list the land he is willing to sell, stating the price and terms at which he is willing to dispose of it. When the price and terms at which the land is offered for sale are reasonable, a formal instrument authorizing the project manager to sell may be executed by the landowner. A form for this purpose will be provided upon requisition by the project manager.

PROCEDURE BY APPLICANT.

12. Every person who desires to obtain any of the benefits of the relief law must file an application with the project manager on the form (7-298a) provided for that purpose. This form has been prepared for the purpose of assisting the applicant to present essential facts upon which the Secretary may exercise the discretion demanded by the law. A full and frank answer to each question propounded should be made. Each applicant should state definitely the nature of the relief desired and the particular paragraph of these regulations under which it is sought, and where relief is applied for under paragraph 7 hereof, the applicant should recite fully the conditions and circumstances that make payment impossible within the shorter period prescribed. The application may be supplemented by any additional showing provided same is submitted in the form of an affidavit. The form (7-298a) may be used by land purchasers under Part I of the Mesa division of the Yuma project in Arizona, questions not applicable being modified or deleted. A supply of printed form of application will be provided upon requisition by the project manager. Preferably, the application should be presented in person at the project office by the applicant, and if delivered otherwise it must be with the understanding, except in an unusual case, that before action is taken thereon the applicant will if necessary appear personally to be questioned relative to the statements made in the application.

PROCEDURE BY UNITED STATES.

13. If necessary, the project manager, or some person delegated by him, shall personally confer with the applicant as to the statements set forth in the application, and in every case shall compile in the form of a statement all information practicably available to him bearing on the assets and liabilities of the applicant, the extent to which he has cultivated

his farm, his personal and actual ability or inability to pay the charges due, and his probable ability to pay the same at a later date. The statement should show where the applicant is residing and what, if any, other business he may be conducting, and with what success. Each application, with the statement of the project manager, will be submitted to the board of directors of the local water-users' association, or irrigation district, for its investigation, consideration, and recommendation. Following action by such board, the application will be forwarded immediately to the director—with copy to the chief engineer—with recommendation of the project manager. In cases where the director fully approves the request of the applicant, his decision shall be final; in all other cases the application shall be referred to the Secretary of the Interior for final decision.

RELIEF TO ORGANIZED GROUP OF WATER USERS.

14. Relief under paragraphs 6 and 7 hereof may be granted to a legally organized group of water users, such as an irrigation district or a water-users' association having a contract with the United States covering the group payment of water charges, or desiring to make such contract. The necessity for such relief must appear from individual showings made upon the regular application blank. However, a special application must first be made by the organized group of water users through the project manager, chief engineer, and director, and each such case will be handled by itself as differing circumstances warrant.

A. P. DAVIS,

Director United States Reclamation Service.

Approved March 7, 1923.

HUBERT WORK,

Secretary of the Interior.

Suit Respecting Klamath Project Land Authorized.

An act authorizing the State of California to bring suit against the United States to determine title to certain lands in Siskiyou County, Calif. (Act Mar. 3, 1923, Public No. 481, 42 Stat. —.)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That consent is hereby given that a suit or suits may be instituted by or in behalf of the State of California in the Supreme Court of the United States to determine the right, title, and interest of such State to certain lands in Siskiyou County, California, alleged to have been ceded by such State to the United States by act of the Legislature of the State of California entitled "An act authorizing the United States Government to lower the water levels of any or all of the following lakes: Lower or Little Klamath Lake, Tule or Rhett Lake, Goose Lake, and Clear Lake, situated in Siskiyou and Modoc Counties, and to use any part or all of the beds of said lakes for the storage of water in connection with the irrigation and reclamation operations conducted by the Reclamation Service of the United States; also ceding to the United States all the right, title, interest, or claim of the State of California to any lands uncovered by the lowering of the water levels of any or all of said

lakes not already disposed of by the State," approved February 3, 1905, and in any such suit the right, title, and interest of such State and of the United States may be fully tested and determined if the Secretary of the Interior is made a party to such suit.

Upon the request of such Secretary the Attorney General of the United States is authorized and directed to defend the right, title, and interest of the United States to such land or any part thereof.

Drainage on the Newlands Project.

An act authorizing an appropriation to meet proportionate expenses of providing a drainage system for Piute Indian lands in the State of Nevada within the Newlands reclamation project of the Reclamation Service. (Act Feb. 14, 1923, Public No. 413, 42 Stat. —.)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby authorized to be appropriated out of any money in the Treasury not otherwise appropriated, the sum of \$41,077.05, payable in 20 annual installments of \$2,100 each, except the last, which shall be the amount remaining unpaid, for the purpose of meeting the proportionate expense of providing a drainage system for 4,047 acres of Piute Indian lands in the State of Nevada within the Newlands project of the Reclamation Service.

The money herein authorized to be appropriated shall be reimbursed in accordance with the provisions of law applicable to said Indian lands.

Water Rights Under Blackfeet Project.

An act authorizing the Secretary of the Interior to enter into an agreement with Toole County irrigation district, of Shelby, Mont., and the Cut Bank irrigation district, of Cut Bank, Mont., for the settlement of the extent of the priority to the waters of Two Medicine, Cut Bank, and Badger Creeks, of the Indians of the Blackfeet Indian Reservation. (Act Feb. 26, 1923, Public No. 444, 42 Stat. —.)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Interior be, and he is hereby, authorized to enter into an agreement, jointly or separately, with the Toole County irrigation district, of Shelby, Mont., and the Cut Bank irrigation district, of Cut Bank, Mont., and thereby to fix the extent of the prior right of the Indians residing and entitled to reside on the Blackfeet Indian Reservation, collectively, to the waters of Two Medicine, Cut Bank, and Badger Creeks: *Provided*, That said districts shall furnish in advance the entire cost to be incurred in determining the amount of the water of said streams to which such Indians are so entitled to priority.

Special Reclamation Investigations.

An act authorizing the Secretary of the Interior to investigate the feasibility of reclamation projects on the Columbia River and various other irrigation projects. (Act Feb. 21, 1923, Public No. 433, 42 Stat. —.)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are hereby authorized to be appropriated, out of any money in the Treasury not otherwise appropriated, to be immediately available for expenditure by the Secretary of the Interior, namely:

For investigations of the feasibility of irrigation by gravity or pumping, water sources, water storage, and related problems on the Columbia River and its tributaries, including the Columbia Basin project, \$100,000; the Umatilla Rapids project, \$50,000; in all, \$150,000.

For cooperative and miscellaneous investigations of the feasibility of reclamation projects, \$125,000 annually.

Appropriation for Special Reclamation Investigations.

(Extract from) an act making appropriations to supply deficiencies in certain appropriations for the fiscal year ending June 30, 1923, and prior fiscal years, to provide supplemental appropriations for the fiscal year ending June 30, 1924, and for other purposes. (Act Mar. 4, 1923, Public No. 543, 42 Stat. —.)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, to supply deficiencies in certain appropriations for the fiscal year ending June 30, 1923, and prior fiscal years, to provide supplemental appropriations for the fiscal year ending June 30, 1924, and for other purposes, namely:

* * * * *

RECLAMATION SERVICE.

For investigations of the feasibility of irrigation by gravity or pumping, water sources, water storage, and related problems on the Columbia River and its tributaries, and for cooperative and miscellaneous investigations of the feasibility of reclamation projects, including personal services in the District of Columbia and elsewhere; purchase, repair, maintenance, hire and operation of motor-propelled or horse-drawn passenger-carrying vehicles; and for all other expenses; reimbursable in the case of any project if and when adopted for construction by the United States or other agency; to remain available until December 31, 1924, as follows: Columbia Basin project, \$100,000; Umatilla Rapids project, \$50,000; cooperative and miscellaneous investigations of reclamation projects, \$125,000; in all, \$275,000.

* * * * *

Special Provisions of the Appropriation Act for the Department of Agriculture.

(Extracts from) an act making appropriations for the Department of Agriculture for the fiscal year ending June 30, 1924, and for other purposes. (Act Feb. 26, 1923, Public No. 446, 42 Stat. —.)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any moneys in the Treasury not otherwise appropriated, for the Department of Agriculture for the fiscal year ending June 30, 1924, namely:

* * * * *

General expenses, Bureau of Plant Industry.—* * * For investigations in connection with western irrigation agriculture, the utilization of lands reclaimed under the reclamation act, and other areas in the arid and semiarid regions, \$94,420.

* * * * *

General expenses, Bureau of Soils.—* * * For examination of soils to aid in the classification of agricultural lands, in cooperation with other bureaus of the department and other departments of the Government, \$15,000.

* * * * *

General expenses, Bureau of Public Roads.—* * * For investigating and reporting upon the utilization

of water in farm irrigation, including the best methods to apply in practice; the different kinds of power and appliances, and the development of equipment for farm irrigation; the flow of water in ditches, pipes, and other conduits; the duty, apportionment, and measurement of irrigation water; the customs, regulations, and laws affecting irrigation; for the purchase and installation of equipment for experimental purposes; for the giving of expert advice and assistance; for the preparation and illustration of reports and bulletins on irrigation; for the employment of assistants and labor in the city of Washington and elsewhere; for rent outside of the District of Columbia; and for supplies and all necessary expenses, \$72,000.

For investigating and reporting upon farm drainage and upon the drainage of swamp and other wet lands which may be made available for agricultural purposes; for preparing plans for the removal of surplus water by drainage; and for giving expert assistance by advice or otherwise in the drainage of such lands; for conducting field experiments and in-

vestigations concerning the construction and maintenance of farm-drainage work; for investigating and developing equipment intended for the construction and maintenance of farm-drainage structures; for the purchase of materials and equipment; and for preparing and illustrating reports and bulletins on drainage; and for the employment of assistants and labor in the city of Washington and elsewhere; for rent outside of the District of Columbia; and for supplies and all necessary expenses, \$72,260.

* * * * *

Demonstrations on reclamation projects.—To enable the Secretary of Agriculture to encourage and aid in the agricultural development of the Government reclamation projects; to assist, through demonstrations, advice, and in other ways, settlers on the projects; and for the employment of persons and means necessary in the city of Washington and elsewhere, \$39,000.

* * * * *

ECONOMIC CONDITION OF THE LANDOWNER.

By Hon. Addison T. Smith, Chairman, Committee on Irrigation of Arid Lands, House of Representatives.

THE farmer has had his innings this session of Congress, but whether he had scored any real hits or not is yet to be seen. At nearly every committee hearing and in all of the larger discussions on the floor of both Houses of Congress the condition of the farmer has been presented from nearly every possible angle. Congress at least, and the people at large, are appreciating as never before that the stability of our Government and of the business institutions rests upon the farmers to a greater degree than upon any other class.

The West and its peculiar problems of reclamation and settlement of arid lands have not been overlooked. The House Committee on Irrigation of Arid Lands, of which I am chairman, has never before had such a continuous period of activity, with frequent hearings and opportunities afforded to all interested to present their views and to argue for or against various measures which have been proposed. It is true that few of these measures have been acted upon favorably by the House, but it takes a long time for the large body of Members from the East and South to be moved to think of western problems when so many are being presented from their own part of the country.

We did succeed in passing a relief bill (Public, No. 454, 67th Congress), not in the shape that any one of us desired, but as in case of all legislation it was the best compromise which could be had. The agitation for relief, while effective in securing attention to the bill, had a deterrent effect upon the consideration of the broader plans of national reclama-

tion. The immediate and pressing needs of the landowners on many of the reclamation projects, of vital importance to these men, were made so prominent that it necessarily obscured the interest in further constructive legislation and confused the subject in the minds of the great body of Members of Congress. However, although the so-called Smith-McNary bill was not reached for consideration in the House it passed the Senate as an amendment to the soldier-bonus bill. We are still confident of the ultimate success of the adoption of a broad policy of reclamation to make opportunities for small farm homes and one which is founded on a recognition of the larger needs of the country in providing such opportunities for its citizens who are seeking a home on the land. We can congratulate ourselves that at least we have not gone backward in the recognition of this principle.

The most prominent fact developed in these hearings and discussions is that the landowners on some of the reclamation projects are so heavily loaded with debts and have such a burden of interest on these debts, as well as State, county, and local taxes, that under present conditions of transportation and markets they can not hold their own. It is also shown that there are two ways of meeting this situation. The first is by endeavoring to cut down the debts and taxes, and the second is by increasing the returns from the farm by diversified crops, improved cultivation and market conditions. All of these must be given more serious consideration than in the past.

First, in regard to cutting down fixed charges. It was shown in the hearings that many of the land-

owners on Government projects who are applying for relief are land poor; that is, they are holding more land than they can successfully handle with their limited capital, strength, experience, and under the present conditions of taxation, interest charges, and markets. If they are to succeed many of them must let go of their excess lands, even though this involves a heavy sacrifice. It should be a matter not alone of money making but of local patriotism to organize ways and means of helping these men dispose of the excess land and at the same time get it into the hands of newcomers who can purchase it at prices sufficiently low to enable them to make a success, assuming that they practice good forms of agriculture.

Next in importance to helping dispose of excess lands and get new settlers and new capital is the question of reducing the fixed charges in taxes and interest. There is no doubt but that in the incurring of public debts there have been excesses. The traditional drunken sailor has been conservative compared to some of our public bodies in getting into debt, especially at the time of inflated prices. At the same time we must recall that these newly settled countries demand good roads, bridges, up-to-date schools and public buildings, and some of them have provided in 5 or 10 years the conveniences which older communities have not obtained in 50 years. The State, county, road, school, and other taxes on the irrigated lands run from \$1 to \$3, or even more, per acre. Many of these can not be cut down; others may be deferred by appropriate action of State legislatures or county officials. There is an awakening in this direction which should produce results.

The greatest burden, however, borne by the landowner on Government projects is the heavy interest charge. This is a constant drain and one for which he can see no end nor compensation. In many cases it only illustrates to him the folly of easy credit. It is a thorn in the flesh or a cloud continually overshadowing all of his prospects. These charges for interest are at rates rarely below 8 per cent and more usually at 10 or even 12 per cent. The average amount of indebtedness of 1,148 landowners who have applied for relief on the reclamation projects is \$6,180, and of this there have been spent for improvements, not all of which are productive, only \$2,439. In other words, the farmer is paying each year a heavy interest charge on nearly \$4,000 which he has borrowed and used largely for unproductive projects, mainly in purchasing land which he can not profitably till, or things which are now practically worn out or discarded.

How he managed to get into debt is interesting and instructive. Take, for example, a typical case. The land, which has no value without water, was given him by the Government. The water supply was fur-

nished by the use of Government funds without interest, or less than cost. He was to return this investment in 10 annual installments without interest. Subsequently this was changed to 20 annual installments, also without interest, or, as expressed on the floor of the House, it was not possible for any man to ask for easier terms than to be told he could borrow, or have the use of, from \$2,000 to \$4,000, if he would pay 5 per cent interest for 20 years, and then have the principal given to him. In the eyes of the men who framed this legislation, nothing had been or could be offered to the farmer on more liberal terms, and the granting of the 20-year time of repayment was regarded as the very limit beyond which no reasonable man could ask to go.

These conditions of free land, obtained on condition of settlement and cultivation, of water had at cost and without interest charges, give the possessor of the land a certain amount of credit. In other words, if he obtained a good farm, he found he could borrow up to and even beyond the investment made by the Government in the land, because it was believed that the land, with water and with a farmer on it, had a value far beyond the investment made by the Government. Millions of dollars in the aggregate were thus borrowed by landowners. Estimates presented showed that, taking all of the 30,000 farms irrigated by the Government, there is a gross indebtedness to bankers, loan companies, implement dealers, and local merchants of \$50,000,000 to \$80,000,000, paying interest on an average of not less than 8 per cent, or an interest bill of \$4,000,000 to nearly \$8,000,000. In the aggregate, each year, under the reclamation projects, the landowners are paying or are urged to pay by local creditors the amount which approaches the total amount that all of them have ever paid back to the Government on the installments for water during the whole 20 years. This illustrates the relative weight of the burden of debts to the private as contrasted with the public creditor.

To put it in another way, even if the landowners on the projects should not pay anything to the Government on these installments, yet the weight of debt would not be greatly lifted. If this is the case, what can be done? The solution, it appears to me, is to bring about a consolidation of the public and private debts. This is not a new scheme, but has been discussed in a general way and is now being better appreciated both as to its opportunities and difficulties. It is believed that the benefits justify a careful study of the conditions and the overcoming of the obstacles.

For example, taking a simple case; here is the average or typical landowner owing \$6,000, on which he is compelled to secure frequent renewals, and is paying an interest rate with commissions which, with

loss of time and worry incident to these renewals, is costing him 10 per cent, or \$600 per year.

He is owing to the Government for the water which makes his land valuable \$2,000, but without interest. His total debts thus amount to \$8,000, and the value of his property, as shown by the average of 1,235 applicants for relief, is \$13,592. His debts are approximately 60 per cent of his assets, an amount which under ordinary conditions will not justify the Federal farm loan banks from advancing the full amount; but, supposing that under existing conditions the Government, in order to get its money back and use it for the benefit of other lands in the West, should be willing to assume the risk of an advance of 60 per cent of the value. Under these conditions, the total debt of \$8,000 could be amortized in 40 years, or less, at a low rate of interest, say 5½ per cent, or \$440 per year in place of the \$600 per year being paid on interest alone and without any reduction of the debt.

The Government will thus be enabled to get back its \$2,000 which has been invested and which is now a frozen asset not bearing any interest. It can utilize this amount of money in completing works already begun and in bringing water to lands and to settlers who have been long waiting for it.

Not all of the cases presented are as simple as this, but permanent relief can come to the majority of the farmers where the land is good and where the owners, who are living upon it, are holding only enough for the support of a family and are industrious and thrifty. It is in these cases where aid can be given and a renewed optimistic outlook had for the future.

But, after all, the great gain will come from the other direction, namely, from increased productivity of the land. While the annual outgo for interest and taxes may and should be reduced by \$5 per acre and the landowner relieved from worry and uncertainty, at the same time, with an equal amount of energy, the productive capacity should be increased not merely by \$5 an acre but by \$10 or more. On every project there are a considerable number of farmers who are not only feeding their families and live stock upon the products from the farm, but are obtaining an average gross income double or treble that of the ordinary farmer. This is due not solely to the condition in soil or location of the land, but to the fact that these men have discovered the secret of success as far as local crop conditions are concerned. The county agents and agricultural experiment station men and demonstrators can point out a score of good farmers who assert that there is nothing magical in their methods, but that practically all the real farmers on the project can do as well if they will use methods which experience has shown to be successful. The difficulty is not always in soil, climate, freight, or markets. It is more apt to be in the man himself

and his slowness to modify his methods. The question of aiding these men has always been not as to what is the best way but how we can induce the ordinary landowner to adopt either the best way or any one of a number of good ways.

The answer is obvious. The way to do this is that followed by every bank and business man. It is the way anyone would adopt if he owned or controlled the irrigation project. There is nothing unusual or untried in it. The way is the one which is followed by every private enterprise and is constantly kept before the attention of the public by the officials of the California State Settlement Board. It is simplicity itself. It is merely to use the leverage of the debts to insure better methods.

Whenever the land-owing debtor goes to the manager of a private project or to the superintendent at Delhi or Durham, Calif., and asks for aid or extension of credit, the reply is, "Of course, we will help you, but what are you doing to help yourself? What is your method of farming; what crops do you propose to raise? Are these the kinds of crops which can be successfully produced and marketed?" There is no dictation in the matter, simply an insistence that the debtor think out the problem for himself and carefully consider and agree to adopt some scheme which meets the approval of good farmers in the locality or of agricultural experts.

Here is where "lemonade can be made from the lemons," where the very difficulties in which the landowner finds himself may be turned to his advantage by giving the proper leverage to his creditors to insist that he do something which will help himself and them; instead of giving him more time during which he may hold his land out of use, or rent it to an itinerant tenant, he is required to consider and adopt some better scheme. He probably knows of some such better way but has not been willing or able to adopt it.

If and when the Government reclamation projects will adopt this business system, will utilize the services of field agents to follow up the various attempts, doing for each farmer on the projects those things which the field men or the beet-sugar companies are accustomed to do, then we may expect to see the average crop production greatly increased and far fewer failures. Of course, not every landowner can be made into a farmer, nor can every farmer be brought up to the grade of the best man on the project, but the experiments already made in a small way on the North Platte project in Nebraska, initiated by Mr. James T. Whitehead, have shown that hundreds of thousands of dollars of crop values can be added if this simple system is put into effect. I am not convinced that legislation is necessary to carry out this plan. If it were I should have urged the passage of a bill. It was only at the end of the session that this simple and obvious plan has been brought to

the attention of the Committee on Irrigation of Arid Lands and its full force and significance made apparent.

Let us, therefore, during 1923 have the most complete demonstration possible made of this idea, and then if at the end of the year we find that legislation is necessary we can undoubtedly express these needs in a clearer form and be prepared to urge any necessary congressional action.

Meantime, let us look forward to 1923 with the optimism which characterizes the West. The gross crop production on the reclamation projects in spite

of difficulties of transportation and markets has exceeded that of the previous year. The repayments to the Government are the largest ever. The majority of the people on the projects are making good in the sense that they are holding their own, and while they may not have gotten ahead notably in 1922, they have kept intact the foundations of prosperity for 1923 and subsequent years. We have at least learned the value of the reclaimed land and the improvements to the West and to the Nation as a whole of maintaining and enlarging the policy of national reclamation and settlement of our waste areas.

EXTENSION OF TIME OF PAYMENT.

PRIOR to the passage of the act of February 28, 1923 (Public No. 454, 67th Cong.), which was introduced as Senate bill 4187, a number of hearings were held by the House Committee on the Irrigation of Arid Lands, in order to afford opportunity for the presentation of the views of various delegations from the projects as to existing and prospective needs of the landowners. A number of important facts were brought out, as shown in the printed proceedings; inquiry was directed especially into the effect of the previous relief act—that of March 31, 1922. Reference was made to testimony already given to the House Committee on Appropriations, on December 11, 1922, where it was shown that there were now existing 34,816 farms, or water-right contracts under the reclamation projects, out of which the act applied to 20,653.

Applications for postponement of charges under the act of March 31, 1922, have been made for 1,741, or 8.43 per cent, of these farms. The total number of applications approved was 1,459, or over 83 per cent. The total construction charges postponed, as a result of the approval of these applications, were \$464,700.

The condition of the applicants for relief was shown by sworn statements, most of which were compiled, giving averages which applied fairly well to all applicants. The most striking condition brought out by this study of the applications is the fact that the majority of the applicants for relief are land poor in the sense that they are holding more irrigated land than can be cultivated successfully with their limited means. Some are holding two or more farms; others have been unsuccessfully trying to rent their farms or operate them with hired labor at excessive cost.

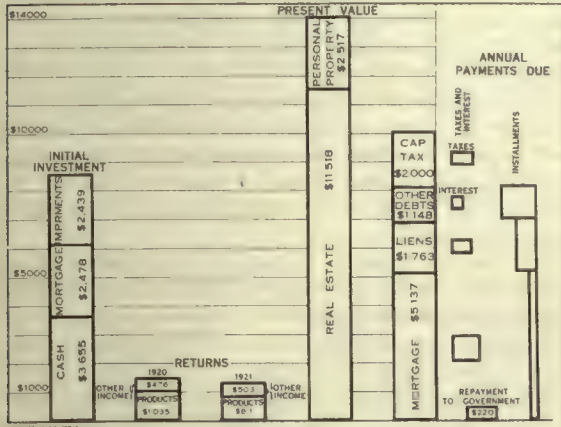
Most of the applicants bought their land at a cost which for 834 cases given was \$6,133 per farm; on this the amount paid, as stated, was \$3,655, leaving a first mortgage of \$2,478; in addition an average of \$2,439 was spent for improvements.

At the time application for relief was made the landowners—or at least 1,210 of them—stated that the average value of their real estate was \$11,518; on this 1,149 owed, in first and second mortgages and liens, \$6,180, on which they are trying to pay interest at rates of 8 to 10 per cent and even more when commissions were considered. The taxes also are heavy, because of the fact that extensive local improvements have been made in roads, bridges, public buildings, etc.

The testimony before the committee emphasized the fact that the main burden of the applicant for relief is in the interest he is paying on his various debts, and in the taxes. It was frankly stated that even if no money was paid to the Government, many of the applicants would be unable to continue under these conditions; they must dispose of some of their lands and get rid of the corresponding load of debts. The field men and others from the Department of Agriculture, who were meeting at that time in Washington, brought out the fact that there is a wide difference in the returns from the various farms on the same project and in the same locality. The average landowner is not getting nearly as much out of his land as are the better farmers in the vicinity. Relief will come not so much from the reduced taxes and interest charges but in getting better returns per acre, as is shown to be practicable where the farmers are following up-to-date methods of farming or marketing. No community made up of small, pioneer farmers can hope for success under conditions where half of the people do not have a cow nor a pig nor a hen, and where little or nothing is raised on the farm for the food of the family. In other words, the single-crop system must in general give way to well-considered rotation and diversification, following the motto: "First feed the family from the farm."

The accompanying diagram illustrates the condition of the applicants for relief. On the left is shown by the vertical column the average initial invest-

ment in cash, first mortgage, and improvements; next to this, the low column shows the returns for two successive years, 1920 and 1921, the figures for 1922 not being then available. This shows that the entire income from the land in 1920 averaged \$1,035. In addition \$476 was earned in other ways than on the farm.



In 1921 the average farm production of the applicants was \$811 and the outside income \$503. Some of the applicants for relief are mechanics, carpenters, clerks, merchants, and others in town, who own one or two small farms which they are trying to operate with hired labor or through tenants.

The tall column indicates the present value of the real estate, \$11,518, and of the personal property, \$2,517; in comparison with this is the existing debt divided into mortgage, liens, and other amounts not secured, such as grocery bills, bills for implements, and other supplies.

The mortgage, which was originally \$2,478, has been increased to \$5,137, this presumably including the cost of improvements made, which are estimated at \$2,439, and other items. The liens, unsecured by mortgages, are \$1,763, and other debts, such as those owed to merchants in towns, aggregate \$1,148. On top of this is placed the estimated tax burden capitalized, this being the amount of money the interest on which would represent the annual taxes on the property.

On the right are shown the estimated annual payments which are due and which cause this demand for relief. First among these are the annual taxes, which run from \$1 to \$2.50 per acre or more, and which if not paid promptly usually involve an additional penalty of 1 per cent a month.

Next below this are the various interest charges, that on the miscellaneous, or so-called "other debts," usually being at the rate of 8 per cent, or, on \$1,148, approximately \$90 per year.

Then comes the interest on the liens, \$1,763. The interest on this is apt to be higher, and with the commissions paid does not fall far below 10 per cent, or \$176.30 per year.

Then comes the heaviest of all—the annual interest on the mortgages, of which there may be a first, second, and even third. Many of these are for relatively short periods of time, and hence a high rate is charged, with commissions for frequent renewals, so that the aggregate amounts to 8 or 10 per cent, or possibly 12 per cent on this amount of \$5,137.

At the bottom is shown the annual installment on the purchase price of the water. This does not bear interest, and in the cases given in the applications for relief this average amount of installments due on construction is a little less than \$220. It is upon this item that all of the other values rest, for without the water the land has no productive value, and no credit for any considerable amount could be obtained by the landowner.

The annual payments of taxes, interest, and installment for the water do not, however, include all of the demands made upon the landowner. It is assumed that he should pay a considerable part of his miscellaneous debts and also a portion of the liens upon his property as well as the installments on the mortgage; hence the rectangles at the extreme right of the diagram indicate that there exist these large claims which must be given attention, and which if not paid promptly should be converted into long-time credit, to be discharged at a lower rate of interest than at present prevailing, and amortized under conditions no more onerous than those offered by the Federal farm loan laws.

Produce All You Eat.

A recent census on one of our projects showed that only 66 per cent of the cultivated farms had any dairy cows, only 26 per cent had brood sows, and only 72 per cent had chickens and farm gardens. It was also found that a number of farms raised no alfalfa and as a consequence had to go out and buy hay elsewhere for farm stock. It would seem, from these data, that a good slogan to adopt on this and other projects in a like situation would be along the line of "produce all you eat."

In this connection observant grocery men have stated that a surprisingly large number of farmers buy butter, canned milk, eggs, vegetables, meat products, and canned fruit.

On the basis of 1,700,000 irrigable acres in 1922, the cost of the RECLAMATION RECORD for that year is estimated at a little over two-fifths of a cent per irrigable acre.

THE AGRICULTURAL CREDITS ACT OF 1923.

Statement by Hon. Henry C. Wallace, Secretary of Agriculture.

ON THE last day it was in session Congress enacted the agricultural credits act. This act is designed to give the farmer the sort of credit he needs to produce efficiently and market in an orderly way the products of the farm. It is an effort by Congress to meet a need which has been felt for at least 50 years. The act may not be perfect. Quite possibly experience will show the need of amendments from time to time. But it furnishes the basis for a system of intermediate credit adapted to farm conditions and farm needs. Also, it should bring about a reduction in the interest which farmers must pay for money borrowed.

The act is divided into two parts. In the first, it provides Government agencies for handling agricultural loans. In the second, it authorizes the organization of private agencies under Government supervision for making loans on live-stock security and on farm commodities on the way to market.

The Government loan activities will be carried on in connection with the Federal land banks. At the present time the country is divided into 12 districts, and in each of these districts there is a Federal land bank which makes land mortgage loans, these 12 banks being directed by a central Federal Farm Loan Bureau in Washington. In connection with each of these land banks there is to be established an intermediate credit bank, located in the same city with the land bank and under the supervision of the officers and directors of the land bank. The Federal Government supplies each of these intermediate credit banks with a capital of not to exceed \$5,000,000. These intermediate credit banks are authorized to discount farmers' notes which have been taken by banks and other financial institutions, and then can carry such notes for a term of from six months to three years. The banks may also loan direct to farmers' cooperative associations under conditions set forth in the act.

These intermediate credit banks may issue debentures which will have back of them the farmers' notes which the banks have taken. The idea is that these debentures may be sold to people who wish a safe investment. They are exempt from taxation, just as the bonds issued by the Federal land banks are exempt. The interest charged by the intermediate credit banks may not exceed by more than 1 per cent the interest paid on the debentures issued, and the farmer who borrows must not be charged an interest rate of more than $1\frac{1}{2}$ per cent above the interest charged by the intermediate credit bank.

No doubt some time will be required to get this machinery in smooth working order. It will be just like building up a new business. It should not be very long, however, until the benefits will be apparent and the farmer will find that he can borrow needed capital for a period up to three years without having to pay an unduly high interest rate, without having to renew his notes every 90 days or 6 months, and without being in danger of having to sacrifice his crops or live stock because of a sudden financial flurry.

The second division of the act authorizes the organization, under a Federal charter, of national agricultural credit corporations, these to be organized by private capital. They will be under the supervision of the Comptroller of the Currency, just as are other national banking institutions. They must have a capital stock of at least \$250,000. They may issue collateral trust debentures up to ten times their capital and surplus. Such corporations will probably be organized in the Western States, where the live-stock industry is important and where now cattle loan companies are in operation.

In addition to the provisions of the act designed to furnish the farmer much needed intermediate credit, certain changes have been made in the law under which the Federal land banks operate and in the Federal reserve act. Provision for the establishment of the so-called permanent organization of the 12 Federal land banks is made by providing that three out of the seven directors for each bank are to be elected by the borrowers from the bank and three are to be appointed by the Federal Farm Loan Bureau. The seventh director, who will be the president of the board, will be chosen from three persons who have received the highest nomination vote for this position by the borrowers or stockholders in the bank.

Heretofore the maximum amount which might be loaned to any individual by the Federal land banks has been \$10,000. This has been increased to \$25,000. Also the purpose for which mortgage loans may be made has been broadened to include the repayment of any existing indebtedness.

The Federal reserve act is amended by broadening the definition of what is called agricultural paper, making it include the grading and processing of agricultural products by cooperative marketing associations. Heretofore the Federal reserve banks have not been permitted to discount agricultural paper for a longer period than six months. This period has been increased to nine months.

A large number of State banks are not now members of the Federal reserve system, some of them because their capital is not large enough to meet the requirements of the law. An amendment to the Federal reserve act is carried in this bill designed to encourage small banks to join the system. A bank which has capital equal only to 60 per cent of the capital required of national banks may now be admitted, if within a reasonable time the capital will be increased to correspond with the capital required of national banks.

The life of the War Finance Corporation is extended up to February 29, 1924, the expectation being that by that date the new credit facilities provided for under this agricultural credits act will be sufficient to meet the needs.

This agricultural credits act of 1923 is one of the most important acts passed by the last Congress. It marks an earnest effort to provide the farmer with the sort of credit he must have to carry on efficiently. It is not class legislation. The results will be helpful to business in general, because the effect will be to stabilize agricultural production and marketing.

SHORT STORIES OF SUCCESSFUL SETTLERS.

By C. J. Blanchard, Statistician, United States Reclamation Service.

A FITTING tribute to western Colorado's resources was paid recently by former Governor Shoup:

"It is almost impossible to exaggerate the possibilities of western Colorado. Possessed of untold wealth in minerals and agricultural resources, it needs but the steadying influence of businesslike methods in agriculture and the development of more adequate railroad facilities to place it among the richest producing districts of the United States. Its average yields of the crops to which its soil and climate are best adapted will prove to the satisfaction of the most incredulous the remarkable value of its lands. Fuel and water power almost without limit are available to encourage the development of manufacturing enterprises to deal with the products of farms, ranches, and mines. Great forests and vast areas of splendid pasture promise an enviable future for the live-stock industry when markets have been established and transportation problems solved.

"In 1921, a year of low values for farm products, Delta County produced food crops to the value of \$3,504,000, and of this total more than \$2,325,000 came from the fruit crops, for which the county and its neighbors on the western slope are world famous. In average yield of the principal crops Delta County leads in five instances, including wheat, corn, oats, barley, and potatoes. Rich, fertile soil and unexcelled climatic conditions unite to make it a farming paradise when the hampering influences which surround farming everywhere to-day have been eliminated.

"Of Delta County's total area of 768,640 acres, only 53,309 were cultivated last year—a fraction less than 7 per cent of the total area—yet authentic reports to-day show that the acreage of irrigable farm land is considerably more than double the amount irrigated now. The development of this farm land will follow instantly upon the development of better railroad

facilities, shortening the distance to market, permitting the farmer to take advantage of the highest available prices, and lessening the cost of transportation.

"Selfishness and ignorance may retard the development of a great area of rich agricultural land and a wealth of mineral and power resources for a time, but they can not do so forever. Ten years ago western Colorado was only beginning to attract the attention of the outside world. To-day it is admitted everywhere that in this district lie the greatest opportunities offered by the West. It has been a process of education, slow but irresistible. The things that remain to be done to bring life to the dreams of two decades are vastly less difficult than the things which have been done. Western Colorado is coming into its own in the near future, and the new year should be greeted with unbounded hope and confidence."

Gathered from the Project Press.

Orland project, California.—At the Tehama County poultry show recently, Orland poultrymen won the following awards: C. W. Davis, first on pen of Rhode Island Whites; first on Rhode Island White cockerel, and first on Rhode Island White hen; Adam Lachenmyer, first on pen of Buff Orpingtons.

Double the acreage planted last year in Glenn County to orchards will be put in the present season. A few months ago, when the figures were published as to the prospective planting the present year, it was thought that the limit had been reached, set by the amount of nursery stock available. Since that time every part of the State has been scoured for additional trees, and the result will be the planting of several hundred acres more than the growers had dared to hope for. Every tree that had been ordered for other districts and later countermanded has been diverted to Orland, and those who have not been able to secure the exact variety they wished have accepted the nearest possible to it, the acreage planted being thus largely increased.

More than 2,000 acres will be planted in Glenn County, of which amount the Orland territory will absorb about an even 1,700 acres.

Uncompahgre project, Colorado.—In a recent contest with 37 creameries, the Delta creamery scored first and was awarded highest honors by the Colorado State Dairy Commission. The pure water and air of high altitudes, the rich pastures and other excellent food in abundance make this valley an ideal spot for this industry. Farseeing ranchers have been improving their strains during the past 10 years, and the project now contains a large number of the finest milch stock. It is only a question of a few years when breeders from all parts of the West will be coming to these ranches for bulls and heifers with which to build up their own dairies.

The valley already has attained a high place in the country for superior seeds, including cereals, potatoes, and onions.

Somewhat over 10 years ago W. B. Stockham conceived the idea of converting a tract of land on Antelope Hill into a Garden of Eden. It had never been watered except as light showers from time to time fell thereon, and in order to furnish sufficient water it was necessary to build $3\frac{1}{2}$ miles of flumes and 2 miles of open ditch.

This was accomplished, and to-day 16,000 apple trees, 1,000 sweet cherry trees, 1,000 pear trees, 800 apricot trees, and 250 each of sour cherry and peach trees make the Antelope Hill orchard a thing of beauty and a source of unlimited income.

The past year four broad-gauge cars of apricots alone were shipped from this orchard, which has never been done from any other orchard in the State, it is claimed.

The Delta sugar factory paid out more than \$300,000 to 360 beet growers the past season. First payments were on the basis of \$6 per ton. On December 15 the rate was \$7 per ton. In addition, the factory employed 75 to 125 men during the season and paid out \$300,000 for repairs, replacement improvements, labor supplies, taxes, and insurance. In most instances the company furnished the seed and, wherever necessary, supplied the labor.

In the corrals 1,500 to 2,000 cattle were fed, the company purchasing more than 2,000 tons of valley hay. Beet yields ranged from 9 to 20 tons per acre.

Boise project, Idaho.—Shipments of agricultural produce and merchandise for the year closing February, 1923, showed an increase of 17 cars over the same period in 1922. Merchants report a fair trade. It is generally agreed by merchants that the cream, egg, and poultry checks and the sales of hogs and a few smaller farm crops do more to steady normal business than the bulk sales of the big crops. There is sound sense in this which all our farmers would do well to remember.

Last month 100 farmers held an all-day session in Caldwell discussing various plans for organizing cooperative associations for marketing their products. Speeches were made by a number of experts in marketing problems. It is a most hopeful and encouraging sign when farmers gather together to thresh out such important questions. Intelligent cooperation by the Boise Valley farmers will prove beneficial.

Fourteen million pounds of wheat and a quarter of a million pounds of alfalfa and clover seed have so far this season been bought of the farmers and shippers by the Parma Elevator Co., according to F. J. Walmsley, manager of this company. The average price for the wheat was about \$1.50 per 100 pounds, and the seed 15 cents per pound. Mr. Walmsley, who

is an authority on farm conditions around Parma, said the wheat grown on this section this last year averaged 45 bushels per acre while the alfalfa seed averaged 7 bushels per acre.

Minidoka project, Idaho.—Our congratulations to Merlin Bowman, of Rupert, winner of the boys' club scholarship of the Idaho University, for his work in the shorthorn club. He ranks every member of the boys' clubs of Idaho as a judge of beef cattle and holds the State championship. Merlin is a high-school boy, the son of Mr. and Mrs. A. C. Bowman.

Some time ago we mentioned that a string of cheese factories were in prospect for southern Idaho. It is a pleasure to announce that one of these is now in operation at Rupert. The factory starts off with 2,500 pounds of milk daily. The second plant is now in operation at Paul, and a carload of cheese already has started for eastern markets.

Encouraging reports are coming from the Minidoka Project Improved Farms Co., organized to promote settlement. Mr. Sherrill, the secretary, says:

"We are receiving inquiries from all parts of the country, and we need more listings. To date we have less than a dozen places to show." Many of the inquiries come from farmers in the Middle West who are prepared to make substantial payments on places here, according to the secretary. "We expect soon to be able to do some advertising throughout the Middle West and hope to show results before long."

In a reorganization of the company recently Mr. Sherrill was elected secretary, John S. Martin resigning on account of lack of time due to other work. R. C. Halliday is president and R. L. Willis manager.

The company is working in cooperation with the Reclamation Service. The plan calls for smaller tracts for intensified farming, dairying men in particular being wanted. Listings are taken if the price set by the owner meets with the approval of appraisers of the company. The listings carries options on the property. The company is a non-profitable organization.

Milk River project, Montana.—Cooperation between the landowners and the Great Northern Railway in colonizing the excess and unutilized irrigable lands of the valley is showing results. Last month 15 families arrived and were located on farms mostly in the Paradise irrigation district. The farms averaged 80 acres each, and the majority of settlers came from the irrigated districts of Idaho. Milk River Valley landowners are offering their lands at reasonable prices and on very long time. It is encouraging to note that the settlers as a class are practical farmers, experienced in irrigation methods, and with capital sufficient to get a good start. The success of this colonization movement bears out our oft-repeated statement that with offerings of good land at fair prices and on the right terms conservative advertising will bring in farmers of the better class.

A few years ago a suggestion that corn could be grown profitably in northern Montana would have received about as much credence as a recommendation to plant bananas. Milk River Valley, our most northern project in the State, was slow to believe, and it was not until the farmers had brought themselves close to ruin by constant cropping of wheat that the county commissioners and State officials, who supplied free seed, were able to induce them to experiment with corn. In 1922, 15,000 acres were planted. Phillips County farmers are now receiving orders for

seed corn, certified by the State college, from many parts of Montana. An increased acreage will be planted this spring from acclimated seed in anticipation of a growing market.

Newlands project, Nevada.—Speaking of cooperation, the farmers on the Newlands project are lining up strong along various lines in cooperative production and marketing. On the Fernley bench a lot of growers are organized to sell cooperatively a large quantity of cantaloupes. Through the county farm bureau, Churchill County farmers have marketed 24 carloads of live stock, mostly calves and hogs. Organizations for handling the large tonnage of poultry should be strengthened and the industry greatly expanded. The activities of the county agent in the past have been most fruitful in results to members, and financial conditions are decidedly improved all over the project. Dairying has forged ahead strongly. The future of this project lies in the development of dairying. What has been accomplished to date demonstrates beyond question that this industry can be depended upon as the safest and surest enterprise for this project.

The project's big crop is alfalfa, and its quality is of the best. The most profitable way to utilize it is to feed it on the farm and convert it into butter fat. There is a ready and near-by market for butter at prices averaging higher than in the Middle West.

Dairying builds up and maintains soil fertility and furnishes regular employment for labor.

H. J. Long, of Fallon, Nev., is again mentioned in the official bulletin of the Holstein-Friesian Association of America, published by Malcolm H. Gardner, of Delavan, Wis., which reports the milk and butter production of cows under official supervision. Mr. Long has one pure bred registered Holstein listel.

This cow, Segis De Kol La Polka, is reported as having made at the age of 5 years and 2 months a record of 723.5 pounds of milk and 23,891 pounds of butter fat in seven days, equivalent to 29.9 pounds of butter. Her 30-day record is 2,939.2 pounds of milk and 89,038 pounds of butter fat, equivalent to 111.3 pounds of butter.

The champion Holstein for Nevada in the full-aged class for seven-day production is Cascade Mary Ormsby, whose record of 608 pounds of milk and 25,498 pounds of butter fat, equivalent to 31.8 pounds of butter, surpasses all others, according to the records of the Holstein-Friesian Association of America. This record production was also made at the Long farm.

At prevailing prices this cow will bring in more than \$50 a month from sales of butter fat alone.

During the months of March, April, May, and June of 1922 dairy herd testing work was carried on extensively on the Newlands project by the Department of Agriculture.

During this period there was an average of 695 cows tested per month. The average production of these cows was 712 pounds of milk and 32.34 pounds of butter fat per month. It may be said that these four months represent a period favorable in high production.

During the months of October, November, December, and January an average of 808 cows were tested per month. The average production has been 672 pounds of milk and 26.6 pounds of butter fat per cow per month. These figures may be said to represent the period of lowest production because of unfavorable weather conditions, the almost total absence of

shelter and the unfavorable period of lactation in the herds.

If we arrive at an average rate of production under local conditions by taking the figures for the early months of summer and the average for the four months of winter, we have an average of 751 cows on test per month producing at the rate of 692 pounds of milk and 29.4 pounds of butter fat per cow per month. Considering the present stage of development these figures are commendable and may be taken as an indication of what is possible under favorable conditions.

Persistent and intelligent efforts in the upbuilding of our dairy industry promise a sure and steady agricultural development and a prosperous community.

Carlsbad project, New Mexico.—From November 30, 1922, to February 28, 1923, the Carlsbad farmers paid into the reclamation fund the sum of \$98,000, or approximately \$1,000 a day.

Landowners in the Carlsbad reclamation project are not in sympathy with the memorial passed by the New Mexico Legislature asking that an extension of time to 40 years be granted to landholders on Federal aid projects, according to Francis G. Tracy, of Carlsbad, in an interview recently. The reason is that the Carlsbad project is paying for itself so rapidly that its landholders do not wish to be delayed in making their final payments and becoming entirely independent. And one of the main reasons for the Carlsbad project's prosperity is its success in growing cotton, Mr. Tracy explained.

Mr. Tracy says the world production of cotton is short millions of bales, and that there is every indication to believe that the present high prices will continue for several years. He said that he believes there will be a successful means of fighting the boll weevil discovered by the scientists working on the problem. At present, the New Mexico cotton fields are not harassed by the pest.

Eddy County last year had the largest agricultural production in the State, amounting to about \$2,000,000, of which a million and a quarter dollars was derived from cotton. Irrigated farms in the county produced as high as two and one-half bales to the acre, while the average for the county was three-fifths of a bale to the acre. The price is \$125 a bale, while the seed more than paid for ginning and other charges. The Carlsbad project in cotton lint and seed produced nearly \$1,000,000.

One of the largest sales of cotton ever made in New Mexico was consummated recently when R. P. Morrison, of Loving, bought approximately 200 bales from E. T. Carter and associates, the price being above 30 cents per pound. Mr. Morrison's check to Mr. Carter was for more than \$30,000.

Mr. Carter is one of the largest cotton growers under Carlsbad project and Mr. Morrison is a cotton merchant of Loving, being a member of the mercantile firm of Morrison & Pardue as well.

The above sale will rank with two or three others made here this past cotton buying season, totaling over \$100,000 for the several lists.

Rio Grande project, New Mexico-Texas.—Progress in the upper valley is evidenced by a building boom at Hatch, where a \$12,000 cotton gin and a \$20,000 hotel are planned for early construction. Hatch is now on the new highway from El Paso to Hot Springs and the dam, and will profit greatly by reason of the large tourist travel which formerly passed across the mesa.

Here are a few nuggets of optimism It is a pleasure to present to RECORD readers:

Cotton acreage in the valleys near El Paso will be more than doubled this year.

From 13,000 acres in 1922 to 28,000 acres in 1923 is a big increase. Money-making land is always in demand, and how this land can grow cotton!

Look at last year's production, 12,100 bales from 13,000 acres. Practically a bale to the acre. Much of it went over a bale to the acre.

Marvelous, says the southern planter, accustomed to a third of a bale per acre.

Land that will do twice as much is worth twice as much; in fact, it is worth more than twice as much, for cost of production does not increase in ratio.

Not only does El Paso Valley land produce a bale to the acre, but its cotton is worth more per pound. It has the quality that counts.

The last crop raised brought 25 to 30 cents a pound. Average cotton elsewhere brought 18 and 20.

There are other advantages than perfect soil, ideal climate, and assured water supply. Growers do not have to worry about markets. Railroads reach out in fan shape to all parts of the country, and there are specially favored facilities for moving cotton to eastern or southern mills at rates that make such shipments attractive.

In time it is hoped El Paso will have her own cotton mills. That forms one of the strong probabilities in connection with the upgrowing of a big cotton producing district here. It will give the city a good push forward in a manufacturing way, furnishing employment, creating pay rolls, and bringing money into El Paso.

Mexico is a waiting market for cotton goods manufactured here, and with the labor supply right here in town and the raw material grown all about us, the prospect looks attractive.

Cotton acreage planned for this year is not its limit. It can be increased by doubling at least once more. There is an opportunity here for progressive up-to-date cotton farmers who work and who know their business.

This is a class to whom El Paso advertising may well appeal. We have something mighty good to show them—cotton production of a kind they have dreamed of but have never seen before.

Organized Farming, published by the Dona Ana County Farm Bureau, and for a number of years a powerful force in the affairs of the farmers, has been consolidated with the Rio Grande Republic and will be known henceforth as the Rio Grande Farmer. The publication, which is weekly, will be edited solely by the farm bureau, on the staff of which are several widely known specialists in various lines of agriculture and stock raising. Its policy, as announced by the board of control, "is to promote cordial relations between business and farming interests, to publish the news of town, county, and district, and to support every movement of merit for the upbuilding of the Rio Grande Valley.

"The Rio Grande Farmer will not take any part in partisan politics, as such; but reserves the full liberty of thought and action in all county and State issues affecting the interests of farmers, including schools, roads, taxes, irrigation and drainage, administration of public affairs, and all projects looking to the development, progress, and prosperity of the Rio Grande Valley."

Our best wishes for a prosperous future are offered to the board.

Yakima project, Washington.—A movement is under way on the Tieton division to build a community hall, principally for the purpose of housing the community fair, which is now an established enterprise. The plan is to erect a brick structure 60 by 100 feet, with a stage and equipment for entertainments during the year. A gymnasium is also proposed. If equipment includes a motion-picture projector, we shall be glad to arrange to release Government films for entertainments.

The Guernsey clan on the Yakima project includes many of the best farmers of the valley. Representatives of their herds are strong competitors for blue ribbons at all the county and State shows, and are attracting buyers from many parts of the country.

Frank W. Connell, president of the Oregon State Holstein Breeders' Association, and W. E. Myer, northwest field representative of the National Holstein Association, looked over valley Holstein herds and visited local Holstein boosters. Accompanied by County Agent A. E. Lovett, he inspected the line herd of Todd & Sons. Mr. Connell, who is the owner of 65 pure-bred Holsteins, is touring the State in search of a blooded bull to head his herd.

"One of the finest herds I have ever seen. The thing that impresses me about the Todd Holsteins is the three generations which he has. That shows his herd is well founded and that he is in the business in a proper manner. I inspected several much larger herds on the coast this week, but they do not impress me as being as high class as the one owned by the Todd people," stated Mr. Connell. Mr. Myer has recently been appointed representative in this district, and is the second man to receive a similar appointment in the United States. He is from the Twin Falls, Idaho, project, and is well known to the Minidoka farmers.

As nearly all our successful farmers have stands of bees, a few words from an expert on the subject may prove interesting.

C. W. Higgins, an expert apiarist in the Yakima Valley, recently made a report on his operations for a year. Mr. Higgins's apiary contains 300 colonies, from which he obtained 30,000 pounds of honey, which, taken with the by-products, returned him an income of \$3,516, at 10 cents per pound for honey. In his report Mr. Higgins figures costs as follows: Salary, \$100 per month; 34 per cent interest on investment (estimated at \$5,698), 7 per cent; annual depreciation, 8 per cent; loss from disease, 5 per cent; wintering loss, 20 per cent; and loss by fire and theft, 5 per cent; total cost, \$3,509.

The figures show that even under present economic conditions Mr. Higgins broke even, paying wages and 7 per cent on his investment. Wait till he hits his stride in normal times.

If a farmers' association is organized to sell a farmer's products, he must sell his products through the association or it is certain to fail in its object.

Problems that confront the selling of agricultural products are much the same in nature as confront any manufacturing plant. The commodity must be put in a standardized condition for selling.

PRACTICAL SUGGESTIONS FOR POULTRY FARMERS.

By H. O. Numbers, Secretary Pennsylvania Poultry Association,
Loretto, Pa.

WE WANT to tell you a little bit more about the results of organization. Here in Pennsylvania we have all caught the spirit, as we have a big membership campaign on, to get 3,000 members added to our State association. There is strength in numbers, and in organization there is power. We have already accomplished much in the protection of our members against fraud. Let me illustrate: A member bought several breeding cockerels and paid a very fancy price. He had not seen the stock, but bought it on the recommendation of the "advertiser's" glowing accounts in the poultry paper. The stock arrived O. K., but the same old story—cheap, inferior grade stuff that should have been killed and served on a table. Ordinarily this member would have had to take his loss, as he had no redress apparently. And, furthermore, the average poultry farmer does not have money to throw away for lawyers' fees and litigation. In this case the member made a full report of his case to the secretary of the State organization. The secretary accordingly took the matter up by correspondence with the shipper. He told him in a few words that the association expected one of two options—either to take the birds back and exchange them for birds of the quality that the price charged would justify, or to take the birds back and refund the money. Otherwise the association would warn all its members of the methods employed by him, and it would see that he did no more business in Pennsylvania. Result: The shipper hastened to reply that a gross error had occurred, and the birds were to be returned at once and money refunded. All it cost the member was the price of postage to the secretary, 2 cents, and he saved more than \$100. That is only one instance. To tell you all we have accomplished with the railroads, the express companies, and the parcel-post service would require more space than the editor could contribute; however, our organization is out to make a name for itself. We want to justify the name Pennsylvania, and make the State poultry association, which bears its name, commensurate with the power the name implies.

We have adopted the following scheme for a membership drive: We have 62 county agents in our State. Each county agent is charged by the secretary of the State association to render an account of his stewardship with reference to boosting the association. The cooperation has been remarkable. We supplied the county agents with proper literature, bulletins, and "join up" application blanks. When they make

their rounds they do poultry missionary work. When enough have "joined up" in a certain territory, we organize them into subcounty or district associations. Of course, each county has its organization, and they are under the mandates of the State association, to a degree. No member can belong to the county association unless he is affiliated with the State association.

Our State college extension forces have aided us more than we can give them credit. They attend to the organization plans and to the standardization methods. We are using our extension men in Pennsylvania.

We have also pledged our coordination to the State department of agriculture, and we mean to promote any plans they evolve as applied to the poultry industry.

In another article I want to discuss our organized selling plan. The first consideration always is the interest of the individual poultryman. Our organization is not for a few, but for all. If you organize, your fundamental requisites for success must be officers who are unselfish, honorable, and not afraid to overwork.

Out of patriotism we raise our esteem for the American eagle. It symbolizes power in connection with our monetary standard. But the bird that, out of necessity, is indispensable in supplying our needs for food, the bird that provides the only source of nourishment for children, sick, and convalescents; the food that bears no substitute during labor troubles, crop failures, financial disasters, bad weather, the little hen keeps laying right along. She bears no national honors yet. But we are out to raise the poultry industry to its proper place.

We beg to quote a few statistics from the United States Department of Agriculture.

"The combined farm value of chickens and eggs produced in 1922 is estimated at \$854,207,000."

"It is estimated that there were 412,000,000 chickens on farms January 1, 1922, a time of year when the number of chicks is low. There were 386,000,000 chickens on farms January 1, 1921; there were 360,000,000 on farms on January 1, 1920, according to census figures."

In the above, the amounts are all estimated. The poultry associations claim more than \$1,000,000,000 is the credit of the poultry industry for the year just passed. That is no small industry. Figure for yourself. If every man, woman, and child in the United States would only consume one egg per day, the

amount of hens on hand the 1st day of January of each year could not supply the demand. But we do not want to tire you with statistics. What we do want is enough people in the United States to raise chickens and produce eggs enough so that the United States will not be compelled to go out to foreign countries to buy eggs for her own needs. This has always been necessary heretofore. America surely can produce enough poultry products for her own requirements, and have some left for export, with all our vast acreage and governmental assistance.

I desire to discuss briefly a common disease that seems to be prevalent this winter, and bids fair to continue this spring. That is, a virulent form of bronchitis. The fowl at first emits a sort of cough, not very noticeable. It appears in good health. If you will observe, it drinks a lot of water. If taken as soon as you notice it gasping for breath and not eating much, you may be able to effect a cure. But if you delay, you may as well cut its head off and rid it of death by strangulation. My treatment has effectively been as follows: Take a feather, dip in kerosene, swab out the throat as far down as the feather will reach. Do this several times, allowing the bird rests at frequent intervals during the operation. After you have used the feather you will notice a form of pus which you have dislodged. Then give the bird about a teaspoonful of olive oil. It may be necessary to repeat this procedure several days. During that time I find it necessary to forcefully feed the bird. I feed a raw egg beaten, and feed with a spoon. I merely suggest this form of procedure for valuable birds, as it does not pay to bother with common stock, unless you have an epidemic. The best precaution against this disease is to keep some permanganate of potassium in the water always, enough to color the water a wine color. I am inclined to believe that the bacteria bug that is the causative agent of this disease infests the atmosphere under certain conditions effected by local environment. I have seen a flock that could not be cared for in better shape. In fact this same flock I would call a criterion. Yet with all the precautions, proper ventilation, and disinfectants, some of the choicest males were affected. The attack comes suddenly and unsuspected. I trust you will not have occasion to use this procedure, but I warn you, if you notice a slight symptom of cold in your flock, lose no time in getting it under control, as your profits soon pass away on dead wings.

Any questions you desire to discuss will receive my prompt and careful attention.

The most important factor in the success of any farmers' organization is the active interest of individual members.

Resolutions Adopted by Directors of West Extension Irrigation District, Umatilla Project.

Whereas the board of directors of the West Extension Irrigation district at their regular meeting at Hermiston, Oreg., on February 6, 1923, have carefully considered the financial status of the district; and

Whereas while the board recognizes that agricultural conditions require improvement and feels sincere sympathy for the delinquent water user; and

Whereas any worthy well-considered movement looking toward the general relief of all the water users will receive the support of the board; and

Whereas the board desires to act in all fairness to all the water users within the district: Now, therefore, be it

Resolved, That in view of article 10 of the district contract with the United States, dated April 6, 1920, "The United States reserves the right to refuse to deliver water to the district in event of default by the district for a period of more than one year in the payments due to the United States pursuant to this contract, and to refuse to deliver water to any lands in default of payments to the district of any water charges herein referred to." That the continued default of payments in arrears more than one year will make it difficult if not impossible for the Government to continue furnishing water. That if the delinquent payments are not made a grave injustice is being made those who have paid their water charges. That the only course open to the board is to determine from the assessment rolls those water users delinquent more than one year and request the United States to exercise the right as stipulated in article 10, above referred to. Be it further

Resolved, That a copy of this resolution be sent to every water user found to be delinquent for more than one year to the West Extension Irrigation district and a copy filed with the project manager of the United States Reclamation Service, Hermiston, Oreg.

EMMETT CALLAHAN,
President.
CHAS. E. GLASGOW,
Secretary.

(Adopted February 6, 1923.)

The officers of a farmers' organization can not make plans unless they know with some degree of certainty how much money is available to bring about the accomplishment of those plans.

If a farmer joins a cooperative farmers' organization he must remember that he must support the association or it is likely to fail.

PROJECT WOMEN AND THEIR INTERESTS.

By Mrs. Louella Littlepage.

WE saw a letter from the secretary of the Phoenix Board of Trade the other day, and across the date line he had written "The sun is shining to-day at Phoenix, Ariz." If everyone in Phoenix is writing that slogan across the top of his letters, what a place it must be to live in! Indeed, the sun must shine every day in a town where the people run up a flag like that.

A Model Community House.

The town of Roswell, in southeastern New Mexico, boasts a community house which might profitably serve as a model for any community.

The house itself is modest in appearance, but its service can scarcely be measured. An average of 1,000 people a month take advantage of its hospitable doors, open to the public from 7 a. m. until 10 at night.

This community house is supported by fixed contributions from the business men, the city council, the chamber of commerce, the Woman's Club, and the churches. One hundred dollars a month covers the up-keep.

The house consists of six rooms—one large general room with chairs, tables, magazines, and other reading matter; an office with free telephone and ice water; a private rest room for women and children; lavatory, hooks, and a place to leave shopping bundles and take care of the baby; a dining room, and two rooms used as a home for the matron.

The house furnishes every convenience for the country woman to change her clothing, rest, freshen up a bit, and care for her children. Her baby is cared for, has its warm food and nap, while she herself can visit the dentist or doctor, shop, or rest. It provides all this comfort which otherwise she would do without or go to considerable expense to secure at a hotel.

There are two tables and a small oil stove in the dining room. Their use is free to shop girls, working women, or in fact to anyone—school children who like to warm up a dish for lunch. Dances are allowed for the young people and working women who board and have no place to entertain. There is no fee; the matron is the chaperone. Civic and church organizations hold meetings here. The two large porches are frequented by half-grown children reading and playing checkers or other quiet games. The matron has their confidence and obedience and the relations are most pleasant. The children of the town or country are free to come and go as at home.

The matron places servants in homes and finds apartments for strangers and assists them to get pleasantly established. There is no fee for this. In fact, there is no attempt to make any part of the expenses of the Community Home. It is supported by the people for the people, and so far the supporters are satisfied with their investment.

What Can be Done with an Egg Beater.

One of the most useful articles in the kitchen equipment is the egg beater, declared an experienced housekeeper to a young bride. It is not only a great time saver but results in much daintier cookery. Instead of mixing the flour and liquid for gravies and stews and sauces with spoon, use a double rotary egg beater and the result will be a thickened sauce that is smooth and velvety. Cereals either freshly cooked or warmed over that are lumpy may be made smooth in an instant by beating with the egg beater. Cocoa is greatly improved by whipping in this way. Much tedious straining of cream sauces can be avoided, and a little practice will bring new uses every day for this little utensil.

Woman's Club Style Show.

"Tennyson's 'Dream of Fair Women'" was the way a local paper described the annual fashion show at the Women's Club in El Paso on March 1. One forgot that it was cold outside, and could almost fancy one's self at some smart seaside resort or fashionable hotel, as the beautiful girls and women, frocked in fashion's latest, made their appearance.

Members of El Paso's smartest society modeled for the various stores whose wearing apparel was on exhibition. Hundreds of spectators packed the auditorium and balcony and every available inch of space, proving that, notwithstanding woman's present political, literary, and professional propensities, she still loves pretty clothes. An encouraging sign, to be sure, for certainly it would be unfortunate if the idea still held that one must be a frump to possess intelligence.

The stage was handsomely decorated with flowers, and in the center stood a large frame hung with dark curtains, through which each model stepped, walking slowly to the end of a raised platform down the center aisle as her name and gown were announced. There was everything from kitchen dresses to evening gowns, negligees, sport suits, garden and dinner costumes, hats and wraps, misses' and childrens' clothing, etc. Even the footwear was furnished to match

the costumes. Egyptian wraps with Tut hats to match were interesting, and alluring smoking costumes tempted the most conservative.

Singing and dancing and appropriate music completed the engrossing afternoon.

A Unique Garden Contest.

The home economics department of the Yakima Woman's Club has received an unusual impetus through the offer of a special prize for the best garden plan for a certain local home. Ten suggestions have been worked out for the garden-plan contest. They include such pointers as advice to first draw an outline of the premises, with the house, all buildings, and trees correctly drawn as to shape and size of buildings and location. All unsightly objects should be screened with tall shrubs or vines, according to directions, and planting should be in masses for succession of bloom or foliage effect. The lawn should be kept open, but some privacy should be planned for by planting high shrubs or vines in front of the porch and where needed elsewhere. There should be some planting next to the foundation of the house to "pin the house to the ground," and soften the hard outline. Straight lines and small useless curves should be avoided. Simplicity is better than overplanting. One should also make good use of the back-yard space, for that part of home grounds offers the best chance for privacy and solid comfort.

Helping One Another.

Early last spring the women of a busy little farming community were considering a motion to end the club meetings until fall on the ground that with spring sewing and spring farm work coming on the time could not be spared for the meetings. Reluctantly they reached the conclusion that it was a wise move, when one member made the proposition that instead of discontinuing their meetings they should keep them going while helping one another out. The club consisted of 12 members, and for 12 consecutive weeks they met at the homes of the members in turn and spent an entire day sewing for the woman who entertained them. The luncheon was a light affair, costing little and taking the minimum of time to prepare, and 12 women can turn out a surprising amount of sewing in a day, especially if it is all planned and ready in advance.

So successful was the experiment that it was repeated again last fall, and in addition they have held several surprise meetings—helping out a young mother, a woman who had been handicapped by sickness, etc.

The plan holds unlimited possibilities.

Easier Housecleaning Methods.

The Department of Agriculture, this city, has issued a new Farmers' Bulletin No. 1180, under the caption "House Cleaning Made Easier." It may be had upon request and contains many helpful suggestions.

Housecleaning need not be the bugbear it has long been regarded in many households. If the work is carefully planned, if the kind of furnishings that are easy to keep clean are chosen and handled in the right way, and if provision is made for keeping all the dirt possible out of the house, there will be no need for the upheavals that result in discomfort to the entire household. The following are good rules by which to organize the work:

First, if possible have good gravel or cement walks from the house to garden and to all the farm buildings. These cost but little if made by members of the household and they can be made easily in spare time.

Keep dirt out of the house by cleaning the walks, steps, porches, and sills regularly and often, by screening windows and doors on the first floor, at least, and by insisting on having muddy shoes and coats cleaned or left outside.

Lessen the number of dust-collecting places, such as unnecessary cupboards, grooved and carved woodwork, floors with cracks, rough-finished walls, elaborately carved and upholstered furniture, superfluous draperies, and bric-a-brac, especially the bric-a-brac. Ornaments which have no use are usually in poor taste, any way, and their elimination will improve the appearance of a room at least 50 per cent.

Remove dirt frequently and systematically. This keeps the house and furnishings in better condition and makes the need of heavy cleaning less frequent.

Clean by taking the dirt away, not by scattering it to settle again elsewhere.

Do the heavy cleaning a little at a time to avoid the hard work and discomforts of the old-fashioned spring and fall housecleaning.

Have a supply of good tools, such as cleaning calls for, and keep them in good order in a convenient place.

Use water and cleaning agents sparingly where they might spoil finishes or weaken glue, paste, or cement.

Watch constantly for troublesome insects and animals, and take prompt measures to get rid of them if they appear.

Make all the family help by insisting they leave things where they belong, and in good condition.

Solving the Boy Problem.

Realizing that the young boys of the town had no place to play or loaf, the Men's Club of a little Idaho town leased a building and started fitting it up with athletic paraphernalia of all sorts for their use.

As soon as the matter was put before the public, funds were subscribed to put the plan across and the problem of keeping the boys off the streets was solved. The house is free to all boys, the only requirement being that they adhere to the rules of the place.

This plan will work in the country as well as in town and is a logical work for the women's clubs. At least they can interest the men of the community, and the school house should furnish a good central location. The social instincts of the country boy need at least as great an opportunity for gratification as those of his city neighbor.

The Chicken Mite.

A very successful poultry woman recently contributed the following information concerning one of the most annoying, persistent, as well as fatal pests which the poultry raiser has to combat:

"When I started to raise chickens I built new houses and the first year was not troubled with mites; but, oh the second year. I tried everything advertised or recommended, and found when I had done a good job of cleaning up with coal-oil emulsion and disinfectants I must do it all over again in about three weeks or the flock would be so reduced in vitality that it would not lay well and would be open to attacks of any disease to which it might be exposed. Eternal vigilance, I was told, was the price of success, and I found it true.

"In calling on a friend one day I asked to see her flock. The building was just a ramshackle old affair to which several lean-to additions had been made as her flock grew. At the first glance inside I hesitated to enter, but she went in boldly and invited me to follow. There were all sorts of boxes and barrels half full of straw for nests and a number of sitting hens. I expected to be set upon by mites, but after a time it dawned on me that there were no mites there, so I inquired how she managed it. She turned to the perches and said, 'See those black perches? That is oil on them.'

"I went home and oiled the perches in my new hen house, and since that time I have had no trouble with mites, and that was three years ago. Each year, after the incubating season is over, I paint the perches heavily with the cheapest lubricating oil procurable. Mites all leave the hen before daylight, going on the perches if only a few, but scattering all over the house if numerous. The oil kills them, and enough of it gets on the feathers to kill the young as they hatch on the hen's body. Don't put the oil on until the hatching season is over, and it is well to keep the eggs off the market that are laid for the first few days after applying the oil. Try this. It is cheap, simple, and effective."

Better Homes Show.

Believing that the women of the Southwest take seriously the business of keeping attractive homes

for their families and providing good and wholesome things for them to eat, the El Paso Herald has established the custom of putting on an exposition every year. No wonder that it is a popular institution. When you come to think of it there is nothing more important, for the entire scheme of happy living depends on good health and centers in the home. Success and failure start on the household and make their way out into the world.

The exposition this year was held in Liberty Hall. There were many booths, all attractively decorated, the El Paso merchants taking great pains to put in them nicely arranged and alluring displays of virtually everything a home needs to make it a good place to live in. Everything emphasizes beauty and practicability combined. Everything aims at making homes charming and comfortable, adding to their permanence by increasing the satisfaction to be had from them.

One of the features is a cooking school, which also includes an intensive short course in home making. There are also instructions in home furnishing, color schemes, and expressing individuality.

Admission is absolutely free. Many men find it worth their while to listen to the lectures and inspect the exhibits. One of them confessed it was an inspiring sight to stand in the back of the hall and watch the audience during a demonstration. Settled matrons, eager young brides, and girls yet in school eagerly take the lesson in, their ears and eyes intent and pencils busy.

Part-Time Agent Plan.

Employment of a third-time demonstrator for Churchill County, Newlands project, is under consideration, the plan being to utilize the time of a demonstrator by Churchill, Lyon, and Pershing Counties. At the present time the assistant director of extension work of the University of Nevada visits the project about four times a year, and monthly visits are made by the demonstration agent of Washoe County.

Home improvement and better kitchen equipment and arrangement are receiving the attention of the club women at present. Women from each community center have been selected to attend the meetings, and later these women will have charge of the demonstration kitchens which it is proposed to establish in each district.

A Handy Tool.

If you do not already possess a pair of good scissors, the kind surgeons use, and which are easily and quickly unjointed for cleaning, make it your business to obtain them for use in your kitchen. In the Government experiment kitchen they always use scissors for cutting cold meats into cubes, for cutting celery or green peppers into small pieces, for shredding cab-

bage or lettuce, for cutting up raisins or dates, marsh-mallows, or figs, for cutting out the center membrane of grapefruit, for cutting out the woody core and eyes of fresh pineapple, for trimming rinds from breakfast bacon, and numerous other tasks which present themselves from time to time. Any scissors, of course, will do the work, but the kind that unjoints can be easily and quickly cleaned and dried, with no danger of rusting, and with good care they last for years, paying for themselves over and over again in expediting work.

Do you know that the Bureau of Fisheries, Washington, D. C., will furnish upon request recipes for preparing oysters and other sea foods; also interesting information concerning aquarium plants, fish, snails, etc.?

Studying Reclamation.

The Montana State Federation of Women's Clubs has included in its program a study of "Reclamation by irrigation in Montana," and the Reclamation Service was asked to assist in outlining the work. As this subject should be an interesting and profitable study for the clubs of the arid States, and especially those on the irrigation projects, the following topics which were furnished to the Montana Federation may prove suggestive as matters for investigation and study:

1. Physical geography of State, including drainage basins, stream flow, precipitation records, etc. (Reports of State engineer, Weather Bureau, RECLAMATION RECORD of January, 1923, p. 15.)

2. History of irrigation under private, State, and Federal agencies. (Reports of State Engineer and Census Bulletin on Irrigation in State.)

3. Water rights. (RECLAMATION RECORD of August, 1920, p. 372, September, 1920, p. 426.)

4. Capital invested by type of enterprise. (Census Bulletin on Irrigation in State and in the United States.)

5. Statistics of kinds of irrigation works, such as reservoirs, dams, canals, laterals, etc. (Annual Report of Reclamation Service, Census Bulletin on State, State Engineer's Reports.)

6. Drainage works and their relation to irrigation. (Reports of State engineer, Census Bulletin on Drainage in State.)

7. Crops, giving comparison between irrigated and nonirrigated land. (Annual Report of Reclamation Service and Census Bulletin on Irrigation in State.)

8. Possible projects and their feasibility from the standpoint of soil, crops, markets, and ability of settlers to repay costs. (Annual Report of Reclamation Service.)

9. Types of farming best suited to Montana conditions, including need of definite plan of agriculture,

rotation of crops, alfalfa and dairying, hogs, poultry, etc. (Reports of State Agricultural College.)

10. What women can do to make life in irrigated regions more attractive. (RECLAMATION RECORD for past nine years, Extension Service of Agricultural College.)

11. Problems of settlement; getting the right type of farmer from the standpoint of experience, capital, and adaptability to State conditions; helping the land-poor owner to dispose of excess lands. (RECLAMATION RECORD of January, 1923, p. 28; pamphlet of E. F. Benson, Northern Pacific Railway, "How California helps men to own farms"; Reports of the Division of Land Settlement, Department of Public Works, Sacramento, Calif.)—L. L.

Secretary Work Believes Idle Land Should be Put to Work.

Secretary of the Interior Work has issued the following public statement in connection with the investigation of the proposed Columbia Basin irrigation project:

"America has been made the greatest and wealthiest Nation in the world through the development of its natural resources. For the last century pioneers have pushed their way westward, undergoing the severest hardships, and through their own individual efforts have cleared and cultivated the lands, resulting in the production of bountiful crops.

"But there remain many acres of land, barren because of the sandy and unwatered soil, that these sturdy pioneers found it impossible to make fertile. So monumental was the task of converting these vast expanses of arid desert into flourishing farm land that even corporations financed by private capital have been unable to overcome these natural barriers. It remains, therefore, for the National Government to solve the problem of irrigating and reclaiming these lands, and that particular activity falls upon the Department of the Interior.

"As the new Secretary of the Interior, I am particularly interested in seeing the successful development of these barren districts of the West until every acre shall be under cultivation, producing whatever crops are suitable to their soil. We expect to begin at once an exhaustive investigation of the biggest single irrigation enterprise in the history of the United States. I refer to the Columbia Basin in the Big Bend district of the Columbia River, composed of 3,000,000 acres of land, 2,000,000 of which it is anticipated will be reclaimed and irrigated should Congress pass the necessary legislation after the Interior Department has submitted the results of its investigation."

BEACHING SLOPES, DEER FLAT RESERVOIR EMBANKMENT,
BOISE PROJECT.

By C. A. Bissell, Engineer, Washington Office, U. S. R. S.

DEER Flat Reservoir on the Boise project is formed by taking advantage of a natural depression in the hills and closing the gaps by earth-fill dams. The two larger of these dams are known as the upper and the lower Deer Flat embankments, respectively, and their principal dimensions are given below :

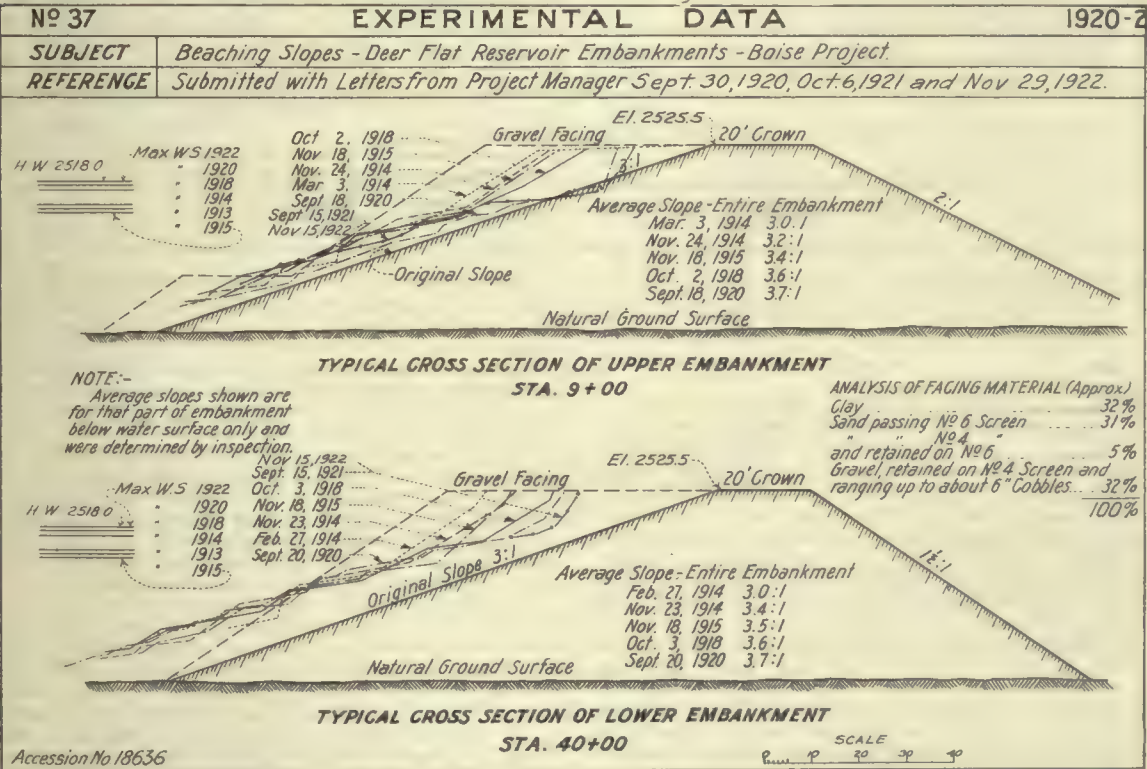
	Upper Deer Flat embankment.	Lower Deer Flat embankment.
Length.....feet.....	4,000	7,200
Maximum height.....do.....	70	40
Volume.....cubic yards.....	1,190,000	1,207,000
Material.....	(1)	(2)
Upstream slope.....	3 : 1	3 : 1
Downstream slope.....	1½ : 1	2 : 1

1 Earth and gravel. 2 Earth.

The area of the reservoir is 9,800 acres and its greatest length, almost squarely facing the lower em-



bankment, is 9 miles. At the time of construction the extensive area and exposed position of the lake



indicated that the wave action would at times be strong and that protection was accordingly important. No rock was to be found in the vicinity of either embankment and the distance from railroad connections made the importation of rock from a distance very expensive. The same conditions made the cost of concrete high and pavement with this material would also have been very expensive. The importance of the question was emphasized by the great extent of the water slope in each embankment and it was finally concluded to try the experiment of protecting these slopes by an excess quantity of coarse gravel.

After finishing the dam to the lines required by the drawings, with 3 to 1 water slope and 20 feet top width, the equipment on the ground was employed in widening the top by dumping from cars on the water slope the coarsest material available, moving the tracks outward as the top width of the embankment increased. This material was composed of water-worn sand and gravel, varying from cobbles of 50-pound weight through all the intermediate sizes to very fine sand, the proportion of coarse material varying somewhat but never great. In this way the upper embankment received about 95,000 cubic yards of extra material, which was deposited on the water slope, taking its natural angle of repose and widening the top of the embankment to a width varying from 51 to 67 feet. A larger quantity was necessary

on the lower embankment as this is much longer. It required about 226,000 cubic yards of material.

Beginning in 1914, cross sections have been taken periodically to determine the slopes to which this gravel had washed down and results through the year 1920 were shown on experimental data card No. 37. This card with the addition of results for 1921 is reproduced herewith.

A recent letter from Project Manager Bond states that cross sections taken last fall show no material changes over 1921 conditions, the difference being so slight that they would not show up on cross sections of the scale of the drawing.

Deer Flat Reservoir was filled to its maximum designed capacity during 1922 on April 20 and was held at that stage until May 5, after which date it was gradually drawn down.

At the time of construction it was estimated that it would be possible to repeat the processes of gravel reinforcement at least twice before reaching the cost of paving the entire water slope, and it seems certain that this never will be required. At the lower embankment the advent of the railway since the embankment was constructed opens the possibility of employing either rock or concrete at some future date should further operations appear to be required. The present indications are that considerable economy is likely to be accomplished over the cost of paving the embankment slopes by the usual methods at time of construction.

THE RECLAMATION MAIL BAG.

Francis G. Tracy, President of the Pecos Water Users' Association, Carlsbad Project, Outlines Views Concerning Relief Measures.

FOLLOWING are extracts from recent letters from Mr. Francis G. Tracy, president of the Pecos Water Users' Association, Carlsbad project, New Mexico, giving the views of the association on the question of relief measures:

PECOS WATER USERS' ASSOCIATION,
Carlsbad, N. Mex., February 17, 1923.

DEAR SIR: Replying to your letter of the 10th instant with reference to the Salt Lake meeting of water users' associations, I believe copy of Pecos Water Users' Association's letter of January 24 is fully explanatory of the attitude of our association. We are opposed to general relief measures applicable alike to those who do not need as well as to those who really need help.

We find nothing in the resolutions to change our views, although we are in sympathy with the effort to relieve actual settlers from overhead properly chargeable to Federal organization, for a national organization program, and not necessary to operation of existing works. Neither have we joined the organization because there seemed to be no definite outline

of obligations assumed through membership and the payment of initiation fee of only \$10, absolutely without financial program, so far as we have been advised.

Carlsbad project is now paying its third 6 per cent installment of construction charges, and we believe it is being done with no more difficulty than the 2 per cent with which we started.

We certainly sympathize with any individual or any project in distress or less fortunate than we are, but we do not agree with you that "the one sound and equitable solution of this problem is a 40-year period of repayment." Indeed, we believe any memorial passed by the New Mexico Legislature to this effect would be unfortunate and ill advised.

It certainly is not easily apparent wherein a 2½ per cent payment on construction is better for you than the 2 per cent you are now trying to meet for the first time. Of course the answer to this is that an average of 5 per cent for 20 years is rather more than twice as burdensome at 2½ per cent for 40 years.

But foresight demands a wider vision than one limited to landowners who can not pay. Something from our experience may be helpful to you. We

began our first construction levy in 1907. We still have eleven 6 per cent payments to make, with grace and certain discretion as to enforcement in the hands of the Secretary of the Interior. Without further postponements we will be paid out as to original construction charge in 1933—actually 26 years from the date of the first levy. Added to this, under the existing law, a supplemental construction charge is being carried for us until 1934, without interest, payments then to be made at same annual amount as our heaviest annual previous charge. We feel this is as liberal as sound finance would sustain.

Aside from any hope for the McNary bill, there is certain construction work on your project and ours that ought to be done, and careful analysis of the financial condition of the reclamation fund makes us seriously question the soundness of any suggestion to make a horizontal cut of 50 per cent upon all repayments, whether it is needed or not. There is a strong desire among our real home builders to pay as rapidly as they can. To those who, at heavy sacrifice, have made their payments, including penalties, the proposition to remit all penalties for those who have not paid does not appear equitable.

Consideration of all these facts, in view of our past experience of leniency at the hands of the various Secretaries of the Interior and the Congress, convinces us that you have not fully considered the matter in all of its phases, and that you do not quite appreciate the detrimental effect upon Congress and the country at large of classifying all irrigation projects and all project farmers upon the same plane with the least successful. We feel that the enemies of Federal reclamation could ask for nothing to happen that will lead so directly to our undoing as our united action upon such a platform.

We do not believe that our southern projects—Carlsbad, Rio Grande, Salt River, Yuma, and Orland—are properly to be classed among the unfortunates, or that it is true foresight to permit this to be done without protest.

We believe that we and the Rio Grande project have had very liberal terms upon construction assessments up to the present time and that we should feel no serious alarm as to the future, in view of the experience we have both had to date. Sound finance for you and for us requires as rapid reduction of debt during good years as possible. When the bad times come we can safely rely upon Congress and the administration for necessary relief under the existing law, with perhaps some well-considered enlargement of the discretionary powers of the Secretary of the Interior to grant postponements without penalties when construction costs are manifestly too high to be met without undue hardship.

We believe, and are ready to so state at this time, that the proposed 40-year extension would be detrimental to the best financial interests of Carlsbad project and of the reclamation settlers as a whole. So believing, we feel unable to cooperate in the present effort to obtain this concession.

Cordially yours,

FRANCIS G. TRACY.

PECOS WATER USERS' ASSOCIATION,
Carlsbad, N. Mex., January 24, 1923.

DEAR SIR: In accordance with resolution unanimously passed by the board of directors of Pecos Water Users' Association at the regular meeting held January 20, 1923, which reads as follows:

"Resolved, That we instruct the president and secretary to write to the secretary of the Klamath irrigation district stating that we are in sympathy with the purpose of the meeting to be held in Salt Lake City, but believe that the purposes stated will be better achieved through the extension of the limitations of the farm loan."

I regret to advise you that we have found it impossible to send a delegate to the Salt Lake City meeting. We find ourselves in hearty accord with the purposes of said meeting, as outlined to us in your letter to our Mr. H. C. Kerr, which we understand to provide a means of financial relief to worthy settlers who are temporarily unable to meet Government charges, without extending relief to those who do not need it. But we do not indorse the method suggested by you to attain this end, but believe the same to be fundamentally unsound, as it would seem to base the proposed issue of bonds upon failures.

We are opposed to new forms of credit at this time, and believe that agriculture can obtain all necessary relief by extending the form of existing credits and enlarging their scope, especially by increasing the limit of the farm loan act and extending its provisions to every reclamation project.

The Orland, Rio Grande, Sunnyside, and the Carlsbad projects are now obtaining farm loans on 34 years' time, 5½ per cent semiannual payment, covering both principal and interest. There is no question that this is a better form of relief than any short-term bond issue. The recipient must be entitled to credit to obtain it, and the Reclamation Service must be paid up in full.

Where credit is given without collateral, we believe the problem is local and personal and must be handled upon the basis of mutual acquaintance and friendship, and no part of the risk can properly be passed to Uncle Sam or beyond the neighborhood confines.

We hope that you will present these views of ours to the Salt Lake meeting, and we earnestly urge upon that meeting the need of cooperation to strengthen and extend the farm loan act and to obtain its benefits for every project.

We believe this can be accomplished without difficulty and that you will find that nothing else will be of so great general benefit to the settlers as a whole and also to the administration of the reclamation act.

Cordially yours,

FRANCIS G. TRACY.

When members of a farmers' organization are not individually a vital part of the organization, the officers soon become of no more force as officers than they would be as individuals.

If every individual member of a farmers' organization would give a few minutes' serious consideration to the organization's problems each day, that organization would grow and increase in power and could not fail to accomplish the purposes for which it was established.

Every local farm organization must have some real object in life or it better die. As a matter of fact it will die unless it does have some worthwhile objective.

PARTICIPATION IN BENEFITS OF RECLAMATION SERVICE STORAGE RESERVOIRS UNDER WARREN ACT AND OTHER SUPPLEMENTAL AND AMENDATORY ACTS.

By H. F. Parsons, Manager and Engineer, Farmers' Irrigation District, Scottsbluff, Nebr.

IN the development of the large irrigation enterprises by the Federal Government it was almost invariably necessary to connect them with adequate storage reservoirs. The changing type of agriculture, together with the enlarging field of irrigation, demanded a supply of late water extending into August and September. The natural flow of practically all mountain streams usually subsides to relatively low stages about the middle of July. With this reservoir building there were frequently surplus storage supplies available to supplement the rights of private canals depending upon direct flow. Participation in these benefits was appreciated and sought at an early date by the private districts so concerned and led to the passage of the so-called Warren Act in February, 1911. This act permitted the Secretary of the Interior to contract with private ditches for the sale of any surplus storage waters which were available for such disposal without detriment to the water users on the Federal project.

The benefits of the Warren Act have been applied in the North Platte Valley with much success, as is ascertained by the rapid development of the agricultural industry within the last 15 or 20 years. Instead of expensive litigation over water rights, storage water has been sold to districts which on their own initiative could never have enjoyed this advantage. Natural water rights have been permanently guaranteed; drainage and waste water has been taken care of; in fact, under the present laws the Government is able to come to the assistance of these private irrigation districts, even to the extent of rebuilding and enlarging their works at their expense, and in one special case, at the joint request of the land-owners and bondholders, it is taking over the operation and maintenance of an entire irrigation system.

Let us apply these general statements, applicable to the Government's operations in the 16 States specified in the original reclamation act, to our own local problems and study the ways in which the Government has served and can serve both the private and Federal water users of this valley.

The key to the successful reclamation of the North Platte Valley was the construction of the Pathfinder Storage Reservoir. This structure has cost to date \$2,300,000. Prior to its construction the entire winter and storm run-off was wasted and only a small part of the spring flood utilized. From the middle of July to the last of August the natural water supply in the

river was decidedly insecure. In rainy years, when the demand was slight, there was some water flowing in the river, but in droughty years, when its use was indispensable, there was scarcely any available. Before the Pathfinder Reservoir was constructed probably less than 30,000 acres of river bottom hay lands were more or less inadequately watered by means of river laterals. Contrast this condition with our 1922 delivery of approximately 3 acre-feet of water per acre to over 300,000 acres of intensively farmed bench lands, some of which are over 150 feet above and 10 to 12 miles back from the river.

Pathfinder Reservoir impounds more than enough water to supply all of the units of the North Platte project; consequently, 10 smaller private irrigation districts have been able under the Warren Act to secure storage-water delivery schedules. The land-owners on the Government project are thus relieved from the payment of approximately 50 per cent of the construction cost of this reservoir. On the other hand, each private district has secured an interest in a reservoir, the construction of which it never could have undertaken single handed.

These Warren Act contracts are based on a certain schedule of water delivery throughout the season, which includes the natural flow right of the contracting party, together with the supplemental storage supply. The charge for such schedule is based upon the supplemental supply required to fill such schedule, in a year representing the average run-off of the three lowest years on record prior to 1912, during which year nearly all these Warren Act contracts were drawn. These three lowest years were 1908, 1910, and 1911. All of these contracts are based on a 10-year repayment period with the exception of one, in which, because of special and additional considerations involved, this period was extended to 20 years.

These Warren Act contracts have materially assisted in eliminating the necessity of the water users of Nebraska having to bear the tremendous expense of a general adjudication of all the water appropriations from the North Platte River. They have also prevented complications which might have developed with our neighboring States within whose boundaries these waters rise.

The Government divisions of the North Platte project whose water is thus guaranteed are the Interstate, Northport, and Fort Laramie. The irrigation districts organized under the Nebraska State law,

taking advantage of this method of protecting their natural flow rights, as well as securing a supplemental supply of storage water, are the Farmers, Gering, Central, Chimney Rock, Belmont, Brown Creek, and Beerline. These interests represent by far the majority of the water users in the valley, and all have a definite and permanent interest in Pathfinder Reservoir, the same as though the money for its construction had been furnished by them in advance.

Pathfinder water is costing the water users of this valley about one-fifth of the average cost of storing water throughout the arid West. This perpetual storage right is costing the farmers' irrigation district \$475,000, approximately \$7.66 per acre, of which about one-third has been paid.

The annual gross crop production of the farmers' irrigation district for the last five years has averaged slightly more than \$3,000,000 per year. A shrinkage in this gross amount of only 16 per cent in one year on account of a water shortage would more than pay the total cost of our perpetual storage delivery rights in this great reservoir. In 1917, the year the river diversion works of the district broke, there was a total suspension of the delivery of water for about 14 days and later only a partial delivery for some weeks. The annual average beet production for the district was reduced on this account about 2½ tons of beets per acre, showing the effect of having a shortage of water during the growing season. This one loss at \$5 per ton amounts to almost twice the cost of our storage water. It is conservatively estimated by those in a position to know that the permanent storage right conveyed by this Warren Act contract is worth \$3,000,000 to the district landowners.

There are other valuable considerations which supplement the actual cash value of this contract. One of these is the establishment of the credit of the district. This at once enhances the credit of each individual district landowner. Financiers who have had experience with irrigation securities understand that a lawful right to an absolutely unfailing water supply backed by a Warren Act contract with the Government is a very desirable asset. They investigate the water rights of an irrigation district borrowing money as thoroughly as they do its financial statement.

The strong financial credit of the farmers' irrigation district is of inestimable value. During the period of financial stress just passed the district, owing to the efforts of B. J. Seger, its secretary, has a ready demand for its district warrants, and thus the money has never been secured for operating and maintaining the system.

There is another advantage enjoyed by Warren Act contractors that might be termed incidental. The purchasing district becomes in a sense a business associate with the Government. In this relationship

it may be possible to establish cooperative relations in the building of drains and outlet channels, and, in addition, there have been several instances of effective Government assistance in case of accidents, such as have occurred on the Tri-State Canal during the last 10 years.

With these cooperative possibilities resulting from the operation of the Warren Act and other supplemental and amendatory acts, every private district should make a careful study of its water and other requirements in order to determine to what extent it can profitably join forces with the Government. There are some marked instances where this can be done with great advantage to the private district.

Stump Land Reclaimed in Oregon.

Interesting developments have taken place in methods of clearing lands covered with stumps. Some of the best agricultural land in the West—notably in Washington, Oregon, and northern California—has long been kept out of use by the great difficulty and expense of removing huge stumps, the cost of clearing an acre of ground running up to \$100 or more. "Necessity is the mother of invention," and the difficulties have stimulated engineers and others to work on the problem, with the result that, as so often happens, a relatively cheap and simple solution of the difficulty has been found and put into practical use. It is one which requires relatively little labor or capital, but does necessitate some thought and skill on the part of the operator.

This method is one which appeals peculiarly to a man of ingenuity as it utilizes the ordinary forces of Nature in a direct way. It consists of so arranging a fire that by a little skillful manipulation of the natural draft of air the stump is converted into a stove and literally consumes itself down into the very roots. Success depends upon the skillful direction of the draft of air into and through the stump, this being controlled by an easily portable inlet pipe and chimney, so arranged that the fresh air meets the fire in a direction such as to cause it to burn deeper and deeper into the stump, instead of merely charring the outside.

The Oregon Agricultural College Experiment Station Bulletin No. 195 fully illustrates the method with pictures and diagrams. It is well worth procuring and reading, especially by landowners who are prevented from getting the best use of their lands owing to the presence of stumps too large to be easily removed by pulling.

The cause of the death of practically every farmers' organization that has ceased to function can be traced directly or indirectly to the lack of interest on the part of the individual members.

ADMINISTRATIVE AND STATISTICAL PROGRESS REPORTS FOR FEBRUARY, 1923.

Monthly conditions of Principal Reclamation Service Reservoirs for February, 1923.

[Elevation above sea level.]

State and project.	Reservoir.	Available capacity in acre-feet.	Elevation.		Storage in acre-feet.			Out-flow in acre-feet.	Elevation of water surface.		
			Spill-way crest. ¹	Lowest gate sill. ²	Beginning of month.	End of month.	Maximum.		Beginning of month.	End of month.	Maximum.
Arizona, Salt River.....	Roosevelt ³	1,305,000	2128.1	1924.6	535,501	578,608	578,608	.....	2088.61	2092.78	2092.78
California, Orland.....	East Park.....	51,000	1199.68	1111.68	31,770	41,910	41,910	.....	1187.68	1194.45	1194.45
Idaho:											
Boise.....	Arrowrock.....	280,000	3211	2956	45,500	52,130	53,560	22,300	3093	3093	3099.6
	Deer Flat.....	177,000	2518	2488	81,340	85,536	85,536	.....	2506.6	2507.4	2507.4
Minidoka.....	Lake Wolcott.....	95,180	4245	4225	88,080	88,900	89,130	291,254	4244.39	4244.46	4244.48
	Jackson Lake.....	847,000	6769	6725	345,130	367,460	367,460	.....	6747.83	6748.85	6748.85
Montana:											
Milk River.....	Nelson.....	70,000	2222	2202	26,200	25,300	26,200	.....	2212.15	2211.8	2212.15
St. Marys storage.....	Sherburne.....	66,000	4788	4720	.....	.....	.....	.....	.....	.....	.....
Sun River.....	Willow Creek.....	16,700	4130	4055	11,847	11,847	11,847	180	4124.9	4124.9	4124.9
Nebraska-Wyoming North Platte:											
	Pathfinder.....	1,070,000	5523	5570	320,140	341,610	341,610	4,165	5799.8	5802.26	5802.26
	Lake Alice.....	11,400	4182	4159	5,566	5,065	5,566	.....	4173.3	4172.4	4173.2
	Lake Minatare.....	60,760	4125	4074	41,194	40,282	41,194	.....	4115.2	4114.7	4115.2
Nevada, Newlands.....											
	Lake Tahoe.....	120,000	6230	6224	.....	.....	.....	15,074	6225.98	6225.83	6225.98
	Lahontan.....	273,600	4162	4060	215,300	228,460	228,460	2,360	4155.1	4157.1	4157.1
New Mexico:											
Carlsbad.....	McMillan.....	45,000	3267.7	3241.6	13,500	20,500	20,500	.....	3260.7	3262.7	3262.7
Rio Grande.....	Elephant Butte.....	2,638,000	4457	4231.5	1,464,074	1,449,705	1,464,074	40,078	4371.9	4371.5	4371.9
Oregon, Umatilla.....	Cold Springs.....	50,000	621.5	560	17,100	24,900	24,900	.....	583.93	601.98	601.98
Oregon-California, Klamath.....	Clear Lake.....	462,000	4540	4514	363,000	366,000	366,000	.....	4536.2	4536.3	4536.3
South Dakota, Belle Fourche.....	Belle Fourche.....	208,000	2975	2920	115,640	125,750	125,750	.....	2962.3	2964	2964
Utah, Strawberry Valley.....	Strawberry.....	250,000	7558	7517	209,100	210,500	210,500	.....	7552.3	7552.5	7552.5
Washington:											
Okanogan.....	Conconully.....	14,400	2290	2233	2,613	2,813	2,813	.....	2257.4	2258.3	2258.3
Yakima.....	Bumping Lake.....	34,000	3475	3389	19,550	7,495	19,550	12,055	3413.9	3400.2	3413.9
	Lake Cle Elum.....	20,800	2134	2122	25,055	24,850	25,055	205	2134.4	2134.3	2134.4
	Lake Kachess.....	210,000	2258	2192	81,155	88,385	88,385	.....	2221.6	2224.1	2224.1
	Lake Keechelus.....	152,000	2515	2425	72,390	76,660	76,660	.....	2477.1	2479.6	2479.6
Wyoming, Shoshone.....	Shoshone.....	456,600	5360	5132.3	329,203	329,203	329,203	13,884	5338.7	5338.7	5338.7

¹ Or maximum storage.² Or zero storage.³ Zero water depth at elevation 1902.2.⁴ Amount of silt shown by silt survey deducted from original capacity.⁵ Proposed regulation.⁶ Estimated low-water limit under proposed plan of regulation.⁷ Draft for vested power rights.⁸ Elevation of reservoir raised 12 inches by stop logs in spillway.

SALT RIVER PROJECT, ARIZONA.

The four regular crews in the field during February, with a daily average of 253 man days and 11 stock days, accomplished the following maintenance work: Twenty-one and one-half miles main canal cleaned, 273½ miles lateral cleaned, 130 structures repaired, 4,359 feet riprap placed, 31 cubic yards concrete placed, 1,174 cubic yards earth excavated, 335 cubic yards earth embankment placed.

In addition, the *Ruth* dredger bermed 5,900 linear feet, moving approximately 671 cubic yards of earth. Owing to the winter season it was not necessary to berm any additional canals, so this machine was put in storage February 6.

With a daily average of 41 man days and 7 stock days, the following construction work was accomplished from maintenance camps: Two and nine-tenths miles new waste ditch dug, 41 new structures installed, 400 linear feet concrete pipe installed, 90 linear feet corrugated iron pipe placed, 79 cubic yards concrete placed, 4,188 cubic yards earth excavated, 741 cubic yards earth back fill placed, 57 cubic yards rock excavated.

Work continued on widening the Eastern Canal: Day and night powder crews drilled 2,464 feet and shot 1,963 feet of holes. The *Monighan*, 2-yard machine, and *Lidgerwood*, 1½-yard machine, moved 10,211 cubic yards of material.

The following work on the Cross Cut drain was accomplished during the month, which finished the job:

Two thousand one hundred and seventy linear feet excavated by the Austin trencher, 1,915 linear feet of 10-inch tile laid, 3,585 linear feet of gravel back fill, 2,000 linear feet of earth back fill by P. & H., 1,251 linear feet of earth back fill by teams.

On February 14 the P. & H. machine moved from the Cross Cut drain to the Chandler drain ditch, section 29-1S-5E, and accomplished the following work: Two thousand five hundred and eighty linear feet of waste ditch enlarged, 550 cubic yards of earth excavated in above work.

Operation of power system.—Total power generated during month, 2,617,130 kilowatt hours; maximum daily output (February 25), 136,200 kilowatt hours; maximum load (February 21), 8,905 kilowatts; maximum daily average load (February 24), 6,210 kilowatts; highest daily load factor, 99.2 per cent; lowest daily load factor, 59.3 per cent; monthly load factor, 43.8 per cent.

The output of the power system for the month was low, owing to the necessity for conservation of stored water. Flood water from the Verde River supplied considerable water for use at the valley power plants.

The Roosevelt power plant operated 99.8 per cent of the time during the month; the Cross Cut plant operated 99.4 per cent; the South Consolidated plant operated 98.3 per cent; the Arizona Falls plant operated 70.1 per cent. During the remainder of the month the plant was shut down owing to lack of water in the Arizona Canal. The Chandler plant operated 99.5 per cent, being shut down for a period for in-

spection and adjustment of the turbine. The substations operated without trouble.—*C. C. Cragin.*

YUMA PROJECT, ARIZONA.

The first carload of lettuce shipped to eastern markets on February 14 netted the growers 75 cents a crate, or at the rate of \$210 per acre. The quality of this lettuce is evidenced by the fact that Imperial Valley growers received a net of only 40 cents a crate. Alfalfa made a rapid winter growth and that cut for hay was excellent. Garden truck was doing fine, untouched by frost.

The *Ruth* dredges and dragline continued the work of cleaning canals and drains, cleaning 18.7 miles of laterals and 1.8 miles of drains.

Mesa division.—Contract for earthwork was completed on February 7 and final estimate amounting to 71,170 cubic yards was made. Work was continued on the manufacture of concrete pipe, 5,744 linear feet of pipe in sizes ranging from 18-inch to 45-inch having been completed. Ten structures involving about 25 cubic yards of concrete and 280 feet of pipe were completed and 672 feet of pipe were hauled from the pipe plant to the field. The 16-inch Krogh pump was operated 234 hours, pumping 351 acre-feet.—*Porter J. Preston.*

ORLAND PROJECT, CALIFORNIA.

February weather was favorable for farm development and there was an unusual amount of activity in the line of tree planting, together with leveling and preparing land for alfalfa.

Placing of concrete lining under supplemental construction was in progress, 2.2 miles of laterals being lined. Owing to the demand for labor in connection with opening up of spring farm work, it was impossible to carry on lining operations to the extent of the full capacity of the mixer. Twelve men and 10 head of stock were engaged in cleaning 11 miles of laterals with teams and in cleaning and repairing 3.3 miles of concrete-lined sections.

The East Park Feed Canal was in operation during the entire month, diverting from Stony Creek and delivering 6,980 acre feet to East Park Reservoir. Storage at the close of the month amounted to 41,900 acre-feet with favorable indications for storage to full capacity of the reservoir in spite of the deficient rainfall for February.

Two sessions of hearings in connection with the Stony Creek water right adjudication suit were held at Willows; the first, beginning on February 6, was concluded on the 8th; the other, starting on February 27, was in progress at the close of the month.—*R. C. E. Weber.*

GRAND VALLEY PROJECT, COLORADO.

February weather was warm and favorable for outdoor work. Considerable plowing and other farm work was in progress.

Camp 5 was reopened and preparations were made to have the system in shape for irrigation by the latter part of March. The dry weather increased the demand for water for domestic and irrigating purposes. Scraping and painting the rollers at the diver-

Crop report, Orland project, California.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.			
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.	
Alfalfa hay.....	6,063	Ton.....	24,563	4.1	\$11.00	\$270,195	\$44.60	
Other hay.....	473	do.....	712	1.5	11.00	7,832	16.50	
Corn, sorghum.....	1,537	Bushel.....	74,980	48.7	1.25	93,725	60.99	
Ensilage.....	15	Ton.....	148	9.9	10.00	1,480	98.66	
Barley.....	593	Bushel.....	13,788	23.2	.60	8,273	13.90	
Wheat.....	101	do.....	2,813	27.8	1.05	2,954	29.29	
Almonds.....	957	Pounds.....	287,960	300.0	.17½	50,395	52.70	
Citrus fruits.....	170	Box.....	3,660	21.2	2.15	7,740	45.50	
Family orchards.....	193				Total.	12,725	65.90	
Prunes, dried.....	183	Pound.....	132,200	724.0	.07	9,254	50.50	
Apricots, dried.....	84	do.....	54,600	1,010.0	.25	13,650	252.80	
Peaches, dried.....	22	do.....	36,500		.085	3,102	168.70	
Peaches, green.....	27	do.....	22,300		.0275	613	40.50	
Walnuts, English.....	47	do.....	3,900	144.0	.28	1,092	34.50	
Olives.....	170	do.....	32,500	692.0	.05	1,625	79.80	
Gardens.....	11	Acres.....			Total.	13,587	108.00	
Watermelons.....	4	do.....			Total.	300	75.00	
Grapes.....	33	Pound.....	26,600	2,418.0	.04	1,064	260.00	
Strawberries.....	33	Acres.....			Total.	1,040	287.00	
Nursery.....	4,887	do.....			Total.	29,270	7.25	
Pasture.....	3	do.....			Total.	35,294	116.70	
Beets.....		Ton.....	70		5.00	350		
Less duplicated areas.....	3,746	Total and average.....					565,560	47.92
Total cropped.....	11,800							
Nonbearing orchards.....	1,698	Areas.		Acres.	Farms.	Per cent of project.		
Young alfalfa.....	822							
Young vineyards.....	383							
Fall-plowed ground.....	629							
Less duplicated areas.....	212							
Grand total irrigated.....	15,120							
		Total irrigable area farms reported.....		16,432	693	81.4		
		Total irrigated area farms reported.....		15,120	693	74.9		
		Under water-right applications.....		14,915	681	73.9		
		Under rental contracts.....		45	10	0.2		
		Under vested rights.....		160	2	0.8		
		Total cropped area farms reported....		11,800	693	58.5		

¹ Box of oranges weighs 60 pounds.

sion dam were in progress and will be completed in good season.

At the end of the month the Orchard mesa siphon excavation was practically completed for a distance of 140 feet in the river section. Concrete had been poured in 131 feet of the barrel and the wasteway structure was finished above the gate operating floor. A total of 535 yards of concrete was placed during February. Excavation for the flume was continued and at the end of the month was 80 per cent complete. A total of 2,900 yards was moved during February. The forms for concreting this section were nearly completed and pouring will be started early in March. The relining of the tunnel on distribution canal No. 1 was continued with a small crew working two shifts per day. One hundred and eighty-five feet were rebuilt during the month, making a total of 237 feet.—S. O. Harper.

Prevailing crop prices at close of February, 1923.

Project.	Alfalfa hay, per ton.		Barley, per bushel.	Oats, per bushel.	Wheat, per bushel.	Potatoes, per bushel.
	In stack.	Baled at shipping point.				
Salt River.....	\$18.00	\$22.00	\$1.00	\$0.70	\$1.25	.....
Yuma.....	13.00	17.00	.....	.....	.....	.....
Orland.....	10.50	13.50	.65	.....	1.26	.....
Grand Valley.....	9.00	12.00	.80	.70	1.15	\$0.35
Uncompahgre.....	7.00	.....	.....	.58	1.08	.15
Boise.....	7.00	10.00	.55	.45	.90	.20
King Hill.....	10.00	.....	.....	.....	.....	.....
Minidoka.....	5-6	8-9	.90	.53	.96	.21
Huntley.....	.....	.....	.....	.....	.....	.....
Milk River.....	10.00	13.00	.35	.55	1.01	.40
Sun River.....	9.00	13.00	.70	.65	1.00	.25
Lower Yellowstone.....	7-10	.....	.38	.27	1.01	.....
North Platte.....	10.00	.....	.....	.....	.....	.24
Newlands.....	8.00	12.00	.....	.....	1.30	.....
Carlsbad.....	.....	25.00	.....	.....	.....	.....
Rio Grande.....	23-25	.....	.....	.....	.....	.....
North Dakota pumping.....	15.00	.....	.....	.....	1.03	.30
Umatilla.....	15.00	20.00	.....	.....	.....	.....
Klamath.....	8-10	.....	.84	.70	1.05	.....
Belle Fourche.....	5.00	10.00	.48	.35	.90	.75
Strawberry Valley.....	11.00	14.00	1.00	.75	1.05	.....
Okanogan.....	.....	18-20	.....	.....	.....	.....
Yakima.....	10.00	14.00	.68	.64	.84	.45
Riverton.....	8.00	10.50	.50	.52	.80	.18
Shoshone.....	.....	.....	.....	.....	.....	.....
Indian projects:	.....	.....	.....	.....	.....	.....
Blackfoot.....	10.00	.....	.31	.48	.90	.....
Flathead.....	10-12	15-16	.....	.....	.92	.30
Fort Peck.....	10.00	.....	.....	.26	1.08	.50

UNCOMPAHGRE PROJECT, COLORADO.

The uncollected water rentals due from the season 1921 on February 28 amounted to \$2,720.95; the total cash collections on February 28 on account of water rentals for the season 1922 amounted to \$82,565.

Mild weather prevailed during the entire month and as a consequence it was possible to carry a flow of water for domestic and stock purposes in nearly all of the project canals and laterals. Despite lack of precipitation in the valley reports from the Weather Bureau indicate that the snowfall on the watersheds is above normal for this time of the year, and it is anticipated that an abundant water supply will be had for the coming irrigation season.

Considerable riprap work was accomplished at mile post 4.30 and mile post 9.55 on the South Canal and

at the South Canal outlet. This work consisted of the placing of woven-wire fencing, backfilled with cedar brush and rock baskets. Miscellaneous minor riprap work was accomplished on the various canals and laterals. The timber flumes on the M. & D. Canal main line, on the C. Q. lateral, and East Canal through the town of Olathe were repaired. The hill slides on the Ironstone Canal extension were cleaned out. On account of the arroya cutting it was necessary to drive eight piles to support the bridge across the arroya at flume No. 1 on the East Canal. Considerable difficulty was experienced during the past year in operating the C. Q. lateral on account of breaks in the vicinity of the Big Sandy flume, and in order to obviate this difficulty a concrete and rock wasteway was built in the canal at this point for control purposes.

The brushing on all project canals and laterals had practically been completed. Various minor timber structures were repaired and work was begun on the installation of taps and measuring devices.

The P. & H. dragline resumed operations on February 20, at which time it began moving to the Selig Canal headworks for cleaning purposes. This work was completed on February 27. The machine then began moving to the Spring Creek feeder work on the M. & D. Canal.

The improvement work in the Gunnison Tunnel was continued. This work consisted of the extending and raising of the concrete lining to the approaches of the short concrete sections and removal of projections in the rock sections of the tunnel.—L. J. Foster.

BOISE PROJECT, IDAHO.

During February the weather was cool and extremely dry.

There were a number of idle men and teams. As soon as spring work opens up the indications are that there will be sufficient work for the unemployed in this vicinity.

Farm work was confined principally to feeding stock and pruning orchards.

The run-off from the Boise River watershed was light, amounting to only about 70 per cent of normal. The reports from the mountainous area indicate that the snow is very compact.

Water was turned into the main canal for filling Deer Flat reservoir on the 16th. Considerable trouble was at first encountered on account of ice conditions. The head was gradually increased until the canal was carrying approximately 1,200 second-feet by the end of the month. All maintenance work was at a standstill during the first part of the month on account of cold weather. As the weather moderated the work was gradually resumed, and by the end of the month several small crews were engaged in repairing structures and cleaning canals.

Drainage work was closed down during the first half of the month on account of frost. The work was resumed after the 15th on both the Drew and Upper Mason Creek drains, and good progress was made during the remainder of the month.

Field work consisted of giving lines and grades for the drainage and operation and maintenance work in progress. Office work was continued in connection with drainage studies, Malheur secondary investigations, and the preparation of the 1922 project history.—J. B. Bond.

KING HILL PROJECT, IDAHO.

February was cold, with little snow. Frost handicapped all earthwork.

Canal enlargement of the Main Canal extension was completed. At wood-stave siphon No. 1 across Snake River the inlet and outlet structures were poured and repairs to the barrel completed. Excavation for Drop No. 2 was completed. At Glens Ferry siphon the inlet structure was completed, as was the laying of 370 linear feet of 48-inch lock-joint pipe under the O. S. L. railroad crossing. Placing concrete around the pipe was begun. At Cold Springs siphon repairs to the wood-stave pipe was completed; the inlet structure, flume pedestals for metal flume, and timber trestle were erected.

Work was begun on concrete lining of the Main Canal at station 181. A small force of men and teams was employed on excavation of Lateral 4E, 4E siphon, and Lateral 9BA.

Laying of lock-joint pipe was completed at three creek crossings and four railroad crossings. Wood-stave pipe lines were completed under the railroad at Laterals 12E, 13E, and 13½E.

At pump No. 1 excavation for inlet was completed and forms placed. Excavation of bench for discharge pipe was 50 per cent complete. At pump No. 2 forms and steel were placed for inlet to penstock and spillway and excavation for by-pass completed. On lateral system 3 lateral turnouts, 6 farm turnouts, 4 drops, 1 check, and 1 bridge were installed.

The lock-joint pipe plant manufactured 9,553 linear feet of pipe, varying in size from 12 to 48 inches. There remain to be made only 448 linear feet of pipe. Practically all pipe made to date has been hauled to site.—*A. M. Raven.*

MINIDOKA PROJECT, IDAHO.

Cold, dry weather prevailed during the greater part of February.

Active negotiations were carried on for a contract between the new American Falls Reservoir district and the United States, covering the purchase of storage rights in American Falls Reservoir. It is expected that a date will soon be fixed for voting on this contract and on the proposed bond issue to finance the reservoir district.

In the Burley office work was continued on the project history and other work of a routine character. A wage scale for laborers and ditch riders was prepared and with slight modifications was approved by the directors of the Burley irrigation district.

One survey party was engaged at American Falls, when weather permitted, in surveying right of way for the reservoir. Hydrometric studies were made in connection with both Jackson Lake and American Falls Reservoirs.—*Barry Dibble.*

HUNTLEY PROJECT, MONTANA.

Usual winter weather prevailed during the greater part of February; the cold spell, however, gradually moderated and mild, pleasant weather prevailed for the last 10 days of the month.

Operation and maintenance work was confined to quarrying and hauling rock for riprap work below Pryor structure. At Ballantine about 10,000 feet board measure of lumber was prepared for use in replacing decayed trap boxes in tile drains.—*A. R. McGinness.*

MILK RIVER PROJECT, MONTANA.

Except for about a week of severe weather, February was in general mild.

Refilling hole in river bed below Dodson dam and revetting bed and banks of Dodson South Canal below Rocky Point, mile 8, were completed. Rock was hauled for riprap and revetment at various places along the canals and laterals, hoists of the sluice gates at Vandalla Dam were overhauled, flume on the N. S. 9-66 lateral across Beaver Creek at Saco was shimmed up to grade, and minor maintenance work was in progress.

On February 20 the First Assistant Secretary approved the form of contract to be entered into by the proposed irrigation districts on the Malta and Glasgow divisions.—*Geo. E. Stratton.*

Summary of employees for February, 1923.

Projects and offices.	Begin- ning of month.	End of month.	Increase.	Decrease.
Washington office.....	76	77	1	
Denver office.....	60	60		
Field legal.....	17	17		
Examiners of accounts.....	2	2		
Yuma.....	194	174		20
Yuma auxiliary.....	59	74	15	
Orland.....	71	71		
Grand Valley.....	114	167	53	
Uncompahgre.....	105	105		
Boise.....	82	104	22	
King Hill.....	226	239	13	
Minidoka.....	56	61	5	
Huntley.....	11	10	1	
Lower Yellowstone.....	15	13		2
Milk River.....	31	30		1
St. Mary storage (includes half time of 7 on Blackfeet).....	9	9		
Sun River.....	62	33		29
North Platte.....	349	316		33
Newlands.....	128	145	17	
Carlsbad.....	44	38		6
Rio Grande.....	678	542		136
North Dakota pumping.....	24	24		
Baker.....	6	6		
Klamath.....	103	125	22	
Umatilla.....	30	30		
Belle Fourche.....	10	9		1
Strawberry Valley.....	18	18		
Okanogan.....	7	6		1
Yakima.....	123	196	73	
Tieton Dam.....	349	344		5
Riverton.....	239	255	16	
Shoshone.....	258	270	12	
Secondary.....	68	61		7
Unassigned per diem.....	26	26		
INDIAN.				
Flathead.....	102	106	4	
Fort Peck.....	6	6		
Blackfeet (exclusive of half time of 7 on St. Mary).....	2	2		
Total.....	3,758	3,771	254	241
Net increase.....			13	

¹ Exclusive of 3 in Denver office.

ST. MARY STORAGE.

February weather was such that no field work of any kind could be done.

Office work consisted of the preparing of a design and estimates for a bridge over St. Mary Canal and work on routine reports, including the annual project history.—*R. M. Snell.*

SUN RIVER PROJECT, MONTANA.

February brought a touch of real winter and little work was accomplished on the farms.

Advance crop report (Fort Shaw division), Sun River project, Montana.

Crop.	Area (acres).	Unit of yield.	Yields.		Per unit of yield.	Values.	
			Total.	Average per acre.		Total.	Per acre.
Alfalfa.....	5,185	Ton.....	7,537	1.5	\$10.01	\$75,448	\$14.55
Barley.....	70	Bushel.....	1,115	16	.70	781	11.23
Clover hay.....	27	Ton.....	34	1.3	6.00	204	7.56
Clover seed.....	20	Bushel.....	72	3.1	7.56	469	23.45
Corn, Indian.....	62	do.....	1,395	22.6	1.00	1,395	22.59
Garden.....	50	Acre.....			103.07	5,128	103.07
Hay ¹	265	Ton.....	246	.9	7.89	1,941	7.34
Oats.....	123	Bushel.....	2,559	20.7	.65	1,663	13.47
Pasture.....	649	Acre.....			6.39	4,079	6.29
Potatoes.....	329	Bushel.....	51,266	155.8	.30	15,495	47.09
Wheat.....	675	do.....	8,971	13.3	.85	7,625	11.30
Miscellaneous.....	15					612	
Total cropped.....	7,470	Total and average.....				114,840	15.38
		Areas.....	Acres.		Farms.	Per cent of project.	
Number of acres irrigated on 207 farms.....	8,075	Total irrigable area farms reported.....	11,838		207	84.86	
Miscellaneous.....	35	Total irrigable area farms reported less seeped, etc.....	9,688		207	69.45	
Total irrigated.....	\$8,110	Total irrigated area farms reported: Under water-right applications.....	7,861		200	56.35	
		Under rental contracts.....	73		3	.53	
		Under vested water rights.....	144		4	1.94	
		Total cropped area farms reported.....	7,470		207	53.51	

¹ Other than alfalfa and clover.

NOTE.—5 units farmed "dry" reported 87 acres of alfalfa, yielded 85 tons, \$850; 24 acres of pasture, \$116; 10 acres of wheat yielded 90 bushels, \$76.50. These farms are not included in the tabulation.

Advance crop report (Greenfields and Big Coulee Divisions), Sun River project, Montana.

Crop.	Area (acres).	Unit of yield.	Yields.		Per unit of yield.	Values.	
			Total.	Average per acre.		Total.	Per acre.
Alfalfa.....	1,484	Ton.....	3,085	2.1	\$10.00	\$30,855	\$20.66
Alfalfa seed.....	20	Bushel.....	62	3.1	15.00	937	46.88
Barley.....	406	do.....	8,017	19.8	.70	5,613	13.86
Clover hay.....	11	Ton.....	20	1.8	8.00	160	14.55
Flax.....	80	Bushel.....	353	4.4	2.00	706	8.83
Garden.....	27	Acre.....			162.20	4,420	162.20
Hay ¹	350	Ton.....	385	1.1	8.95	3,134	8.95
Oats.....	1,127	Bushel.....	34,299	30.4	.65	22,295	19.78
Pasture.....	234	Acre.....			5.38	1,259	5.38
Potatoes.....	137	Bushel.....	14,749	107.5	.30	4,425	30.78
Wheat.....	11,913	do.....	225,665	18.1	.85	191,817	16.10
Miscellaneous.....	12						
Total cropped.....	15,800	Total and average.....				265,850	16.82
		Area.....	Acres.		Farms.	Per cent of project.	
Number of acres irrigated on 196 farms.....	12,415	Total irrigable area farms reported.....	22,013		* 197	100.00	
Total other purposes.....		Seeped area (no data available). Total irrigated area farms reported under rental contracts.....	12,415		196	56.40	
Total irrigated.....	12,420	Total cropped area farms reported.....	15,800		197	71.78	

¹ Other than alfalfa and clover.

* Includes 1 farm seeped but not using water.

NOTE.—7 farms whose crops were partially destroyed by hail reported 102 acres of alfalfa yielded 128 tons; 10 acres of barley, 87 bushels; one-acre of garden, \$45; 49 acres of hay, other than alfalfa and clover, 31 tons; 37 acres of oats, 614 bushels; 7½ acres of potatoes, 591 bushels; and 606 acres of wheat, 2,601 bushels. These farms are included in the tabulation.

During the early part of the month location surveys were completed on open drains B and C on the Greenfields division and investigations made to determine the character of the subsurface material. Some work was accomplished on the construction of the sand and gravel plant and cement shed for the repair job at mile three, Greenfields Canal. In the office, work was in progress on project history, checking land ownership on the Greenfields division, plotting drain profiles and sections, and computations on estimates.

Shipments from the project were as follows: Fairfield, 9 cars of wheat, 1 car of hogs; Fort Shaw, 2 cars of hay; Simms, 10 cars of hay, 1 car of wheat, and 1 of potatoes.

The hogs were sold in Great Falls at \$8.75 per hundredweight.—*Geo. O. Sanford.*

LOWER YELLOWSTONE PROJECT, MONTANA-NORTH DAKOTA.

Other than the last six days of February the weather was extremely cold.

The price of farm products remained about the same but owing to the advance in the price of sugar those who raised sugar beets in 1922 expect to receive a further bonus. From present indications the acreage in sugar beets in 1923 will be double that in 1922.

Four carloads of sheep were shipped to the eastern markets from Fairview, and several carloads of hogs have been shipped, the greater part of them going West.

There are 31 farm units unentered on the project, comprising about 2,000 acres, which it is expected will be thrown open to entry about June 15, 1923.—*L. H. Mitchell.*

NORTH PLATTE PROJECT, NEBRASKA-WYOMING.

On the Interstate division the usual repair work on structures and riprapping canal banks was carried on.

On the Fort Laramie division the canal was operated to the power plant without any difficulty and a small force was employed on building roads on canal banks and riprapping.

On the Pathfinder division plant and equipment were being prepared for grouting conduit No. 2 in the south tunnel.

On the Interstate division, main canal enlargement was in progress with two Monaghan gasoline draglines and two P. & H. gasoline draglines. The Bucyrus class 14 dragline was being moved to this work also, and traveled 41 miles during the month.

On the Fort Laramie division two Bucyrus electric draglines were employed on canal excavation, one Bucyrus electric dragline on drainage work, and one Austin gasoline dragline on miscellaneous work at the Horse Creek siphon. This structure is 40 per cent completed. On the Horse Creek lateral system, the east branch of the Table Mountain lateral system, and the main canal between Horse Creek and the State line such work as hauling gravel, lateral excavation, and placing concrete was being carried on by contractors and Government forces, the average force employed by both being about 100 men.

On the Northport division all structures were completed on the Indian Creek drain excepting one timber bridge. It is expected to complete practically all work on this division during the month of March.

Red Triumph potatoes were selling for 40 cents per hundredweight and white potatoes for 20 cents per hundredweight. A number of the farmers who have

hogs and cattle were feeding them potatoes. Approximately 40 per cent of the potato crop was still on hand.

The Great Western Sugar Co. announced its intention of paying an additional \$1 per ton for beets of the 1922 crop. This makes the second \$1 paid and will make a total payment to date of \$7 per ton. It is expected that another payment of 50 cents to \$1 per ton may be made if the present price of sugar is maintained.

A large percentage of the sheep which were fed during the winter had been marketed and the market was generally favorable for the shippers. Several cars of cattle and one car of hogs had been shipped also.—*Andrew Weiss.*

NEWLANDS PROJECT, NEVADA.

Frozen ground interfered with good progress on drainage excavation and interrupted lateral cleaning work.

The Lahontan power plant and Truckee Canal were operated as during the previous month, the canal flow being reduced during a portion of each day during a portion of the month to facilitate tunnel repair work. Ice conditions in the canal made discontinuance of Truckee Canal tunnel repair work necessary during the early part of the month.

Repairs to paying of face of Lahontan Dam were completed February 7.

Three and one-fourth miles of laterals were cleaned, using teams. The new Ruth dredger for ditch cleaning arrived on February 3 and commenced cleaning the Lc lateral on February 28.

Four concrete structures and four minor timber structures were installed by operation and maintenance forces.

On February 20 advertisement was issued calling for proposals for about 23,235 cubic yards of Class I earthward in construction of new laterals, T system. Numerous water users signified their intention of entering bids.

Five drag-line excavators engaged on drainage construction work under the irrigation district contract moved 179,250 cubic yards of material in construction of about 4.5 miles of new drain. Two drag lines on drainage work being done as operation and maintenance moved about 8,640 cubic yards of material in drains—aggregating about 1 mile in length. Thirty-one timber structures, involving 55,954 feet board measure of lumber, were installed by drainage forces.

At a meeting on February 5 the directors of the Truckee-Carson irrigation district passed a resolution fully approving the proposed contract between the United States and the Canyon Power Co. for the lease of the Lahontan power plant.

The project manager, together with interested water users, conferred with Gov. J. G. Scrugham on matters relating to the proposed Lahontan power contract in Carson City on February 13. A similar conference was held on February 19 between the project manager and Mr. Edison Adams, president of the Canyon Power Co., in Oakland, Calif.

At a joint session on February 28 the Nevada Legislature, with two dissenting votes, passed a resolution indorsing the Spanish Springs Reservoir project and asking the Secretary to sign the Canyon Power Co. Lahontan power contract.

Arrangements having been made for marketing, preparations were under way for planting a considerable acreage to Hearts of Gold cantaloupes, a superior melon, and one grown most successfully on the Newlands project.—*John F. Richardson.*

CARLSBAD PROJECT, NEW MEXICO.

February weather was fair until about the 5th, when light showers occurred over a period of several days. On February 22 a rain commenced, which lasted for several days. This precipitation was very timely for the live-stock interest on the range.

Five maintenance crews under the foremanship of the ditch riders were employed cleaning laterals at such times during the month as water was not in the canal and the weather permitted. One crew, under the regular foreman, was employed in repairing and protecting small structures in the lateral system. The general cleaning work was about 75 per cent completed at the close of the month. Water was turned into the canal for winter irrigation on the 12th and was turned out again on the 23d. This water was generally used for irrigating alfalfa and for other irrigation preparatory to plowing for the ensuing season's crops.

J. N. Kerr, engineer-appraiser, of the Federal Land Bank, Wichita, Kans., arrived on the project on February 3 and remained for several days examining farms on which loans had been requested.

General activity on the farms consisted of breaking fields for cotton and renovating alfalfa fields. The rainfall on the 22d was of great benefit to the farms and provided a deep plowing season. It is estimated that about one-third of the acreage which was in alfalfa will be reduced greatly, as little alfalfa was planted during the fall of 1922. Good gains in weight were reported by feeders who are fattening beef animals and sheep on the farms. Alfalfa hay stored on the farms was bringing prices averaging about \$25 per ton. About 600 bales of bolley cotton was sold the early part of the month at an average price of 22 cents per pound. Mr. E. T. Carter, one of the project farmers, sold 200 bales of cotton at the close of the month for 30½ cents per pound.

Total collections for the month on account of operation and maintenance and construction amounted to \$21,706.71. Notices of delinquency were issued on February 27. Construction on three new business buildings in Carlsbad was started during the latter part of the month.—*L. E. Foster.*

RIO GRANDE PROJECT, NEW MEXICO-TEXAS.

The principal features under construction during February continued to be on canal and lateral extensions, reconstruction, and improvement, a number of the larger drag-line excavators still being diverted from drainage to this work. In the Rincon Valley the Monighan 1-T excavator constructed 2,000 feet on the extension of the Garfield drain, and a few minor structures were installed in laterals. In the Mesilla Valley two drag-line excavators, one Bucyrus 9½ and the Monighan 2-T were employed on drain construction. Two of the Bucyrus 9½ excavators were employed on canal improvement while one of the P. & H. 206 excavators was employed on new lateral construction. One of the Ruth ditching machines in the Mesilla Valley was employed on maintenance work on the Montoya lateral system, while the second continued on reconstruction of the old laterals; 110,000 cubic yards were removed from 2 miles of drain and 75,600 cubic yards were placed in 4.6 miles of canal and lateral construction, the two Ruth machines moving 13,800 cubic yards from 6.8 miles of old laterals.

In the El Paso Valley one Bucyrus 9½ excavator worked a part of the month on drain construction

and the remainder on lateral construction. Work on the Tornillo canal progressed with the operation of the second Bucyrus 9½ and the 30-B machines. Structure work progressed very satisfactorily and the canal will be ready for operation about March 15. The P. & H. excavator in the El Paso Valley continued the construction of the island lateral system, a small team crew also being employed on this feature. The Ruth ditching machine removed 11,000 cubic yards from 5 miles of old lateral; 82,600 cubic yards were moved in canal and lateral construction, and 19,600 cubic yards by small team crews.

The irrigation season began on February 1, but the demand for water was so light that after a few days' run it was again turned out of the canals in order to facilitate construction progress, and was turned in permanently about February 12.

With the beginning of the irrigation season several changes were effected in the personnel and organization of the operation and maintenance department, the principal change being the departure of T. W. Parry, irrigation manager for the past five years on the Rio Grande project, to assume the management of the operation and maintenance of the North Platte project.

Light irrigation water demand were the result of more cold weather and rain during the month than during the previous month of the season. Large areas are being cleared and the uncultivated area, especially in the El Paso Valley, is being rapidly reduced, mostly as the result of prospects for a good cotton yield with high prices, helped along, of course, by the levying of the first assessment and minimum operation and maintenance charges.—*L. M. Lawson.*

NORTH DAKOTA PUMPING PROJECT.

February weather conditions were unusually severe and maintenance work was limited to inside work in the coal mine and power house.

The usual plant operations were carried on for the commercial power contract; 94,400 kilowatt-hours of energy were delivered to the city of Williston, which was about 10,000 kilowatt-hours more than during the same month of last year. This can not be accepted as indicative of a large increase in demand, but was due principally to the weather conditions of the month and the temporary pumping by the city of the water supply for the railroad, which had difficulty with its intake station.

In the coal mine, 883 tons of coal were mined, and the progress of blocking out the summer supply of coal was good.—*Wm. S. Arthur.*

BAKER PROJECT, OREGON.

From February 1 to 15 wintry weather prevailed. After that a change took place, the snow began to melt, and springlike weather commenced which continued to the end of the month.

No field work was in progress. The office work consisted of miscellaneous drafting and computations and the platting of line topography and paper location of the North and South Canals. A classification of the project irrigable lands into public, private, and State lands was undertaken and completed. The area of each property owner under the old ditches and his decreed water right were segregated and computed with a view to ascertaining the waterlogged lands and those requiring storage under the old ditches.—*C. C. Fisher.*

UMATILLA PROJECT, OREGON.

Cold and stormy weather prevailed during February. There was a heavy snowfall in the mountains, which was much needed as a source of water supply for irrigation.

Farming operations were confined principally to feeding and care of stock. Marketing of hay was extensive and preparation of the land for this season's crops was under way as weather conditions permitted.

The feed canal was operated until the 13th, when the water had to be cut out on account of ice. Operation was resumed on the 21st and continued during the balance of the month. Small crews on the east and west divisions worked intermittently cleaning laterals and repairing buildings and structures.

On the A Canal improvements three minor structures were built. About 210 cubic yards of material were excavated and 800 linear feet of 16-inch and 60 linear feet of 12-inch concrete pipe were laid on lateral extensions under supplemental construction.

The Standard Oil Co. is erecting a distribution and storage plant at Hermiston. With the prospects of construction work starting on McKay reservoir in the near future there is quite an optimistic outlook regarding the future of the project. The company exploring for oil continues their operations and are now down 200 feet and in very hard material. A banquet was tendered the officials of the service who made up the board to outline the policy in regard to McKay Creek reservoir, on the night of the 23d. Expressions as to the good relations now existing with the service were expressed. The delegate to the Salt Lake conference returned and reported that the conditions on this project were far superior to other reclamation projects represented at the conference.—*H. M. Schilling.*

KLAMATH PROJECT, OREGON-CALIFORNIA.

Only a small amount of construction work was in progress during February. In the Tule Lake division the ground was frozen to a depth of about 12 inches so that the smaller draglines could not be operated to advantage. The contractor for the minor structures had his work well in hand and should easily finish the work by May 1, the specified time. In the Langell Valley division a small crew of Government forces was engaged in placing crushed rock and riprap on the slopes of the earth embankment, and in drilling and blasting the upper portion of the West canal.

Drawings were completed for the bridges and structures for the West canal, Langell Valley division. Advertisement and specifications will be issued in the near future.

A considerable number of cattle were being fed for the market. During the winter several shipments of cattle were made to California points. Lambing will be begun in a few weeks; the indications are that the lambing will be completed before the flocks are transferred to the open range.—*Herbert D. Newell.*

BELLE FOURCHE PROJECT, SOUTH DAKOTA.

February weather was more than usually cold but otherwise was not disagreeable.

The Inlet Canal was the only canal in operation during the month. It ran continuously and delivered 8,984 acre-feet to the reservoir. The canal was frozen over most of the month but the ice went out during the last few days.

Sand and gravel was hauled for two concrete chutes on the Herman lateral, and timber for repairing the Stinkingwater flume was delivered.

Mild weather throughout the Wisconsin and Minnesota dairy sections cut off the demand for alfalfa hay and shipments from the project checked up very suddenly. Probably all of the first-grade stuff will find a market, but from present prospects there is likely to be a rather large amount of second-grade or slightly damaged hay that will neither be used nor shipped.

Lambing had begun in a number of droves and reports of percentage and condition was favorable. The spring litters of pigs were beginning to arrive in very satisfactory numbers and condition.

Stock wintered well on a reasonable amount of feed, owing to the open winter and absence of storms.

The campaign for organizing the project into a district under the State law in order to be in position to accept a contract for extension of time on payments offered by the Secretary of the Interior took on added interest during the last two weeks preceding the election and a number of local mass meetings were held throughout the project. The result of the election was as follows: Votes cast, 468; 367 for and 101 against the district.—*B. E. Hayden.*

STRAWBERRY VALLEY PROJECT, UTAH.

February weather was generally fair. The fore part of the month was stormy, with intermittent cold weather; the latter part fair and generally mild.

The price of all farm commodities remained practically stationary. A few shipments of grain were made to various milling companies. Feeding of live stock on the project continued and numerous shipments were made to southern California points and greater movement is expected during the coming month.

The power plant was in continuous operation, delivering electrical energy under contract to the several project towns. Altogether 94,725 kilowatt hours were consumed and revenues amounted to \$1,880.85. The new Woodward governors for the generator turbines were shipped on the 26th. Final draft of contract between the United States and the Denver & Rio Grande Western Railroad Co. for sale of power to the company at Thistle, Utah, was prepared by the Denver office.—*W. L. Whittemore.*

OKANOGAN PROJECT, WASHINGTON.

The weather during the first of February and the latter part of the month was mild, but was unfavorable for outside work on account of snow and frost. It was seasonable weather, however, for the ranchers who had pruning to do in the orchards. For several days in the middle of the month stormy weather and high winds prevailed, with a low temperature, which stopped all outside work on the farms.

The inflow into Conconully Reservoir was 200 acre-feet and into Salmon Lake Reservoir 94 acre-feet, making a total of 294 acre-feet gain in storage during the month.

Transportation conditions remained good throughout the month and all cars that were necessary for the shipment of fruit were available.—*Calvin Casteel.*

YAKIMA PROJECT, WASHINGTON.

The temperature for February was below normal. *Granger irrigation district.*—Metal pipe forms for the 33-inch concrete lock-joint pipe for the siphon

were delivered on February 13 and manufacture of the pipe was started on the 18th. Excavation of pipe trench with No. 4 Austin dragline was started on the 6th, and about 1,000 feet had been excavated at the close of the month. About 500 feet of trench through the orchard section was excavated by a hand crew.

Sunnyside division.—Work consisted mainly of grubbing willows on main canal and spillways, cleaning culverts, painting iron parts on turnout structures, etc. Overhauling of pumping plants was continued, and the discharge pipe at the Grandview pumping station painted.

Tieton division.—Maintenance work consisted of cutting and grubbing willows on main and sublaterals, minor repairs to delivery structures and measuring boxes, and a small amount of betterment work consisting of excavation of trench and laying of 10-inch and 12-inch wood-stave and concrete pipe to replace small wooden flumes.—*J. L. Lytel.*

TIETON DAM.

February weather was unfavorable for construction work. Trucking between Naches and Rimrock was continued throughout the month. The average force employed was 304 men, with no difficulty in securing sufficient labor.

The Bucyrus electric and Marion 35 shovels were in spillway solid rock excavation throughout the month. The Bucyrus B-45 shovel was worked in spillway excavation the first half of the month. Material excavated was placed in rock fill embankment.

Reservoir clearing was continued by Government forces and small contractors.—*F. T. Crowe.*

RIVERTON PROJECT, WYOMING.

Roads were in excellent condition early in February and in fair condition later. On account of the low temperature weather conditions were unfavorable

for construction. The flow of Wind River was about normal, and the snow storage is believed to be less than normal.

On the Wind River diversion dam draglines 121474 and 121322 excavated 2,116 cubic yards of gravel and 60 cubic yards of sandstone for the weir, practically completing this excavation and collected and screened gravel for concrete; also loaded 827 cubic yards of material on wagons for backfill near the headworks. The foundation of the remaining 40 feet of the weir and foreapron was brought up to elevation 5,541.5, and the base of the right abutment was brought up to elevation 5,546.5; six of the seven bridge piers are complete; 1,296 cubic yards of plain concrete and 532 cubic yards of reinforced concrete were placed.

On the first division of the Wyoming Canal, trimming for the culvert at station 30 was completed, amounting to 355 cubic yards. Trimming for the canal lining above station 13 and excavation for the drainage inlet and bridge at that station were in progress; 2,880 cubic yards were excavated; 1,670 cubic yards were placed on the lower bank of the canal by wagons above station 6. Steel was hauled for canal structures.—*H. D. Comstock.*

SHOSHONE PROJECT, WYOMING.

February was an unpleasant month. During cold spells from the 1st to the 4th and from the 9th to the 16th minimum temperatures were below zero. These spells were accompanied by winds which made outdoor work very disagreeable. Roads were in good condition, except during a few thawing days at the close of the month.

At the Willwood Dam concrete work was continued when weather conditions permitted; 2,567 cubic yards were placed, making a total of 10,614 cubic yards placed to date. The class 14 Bucyrus electric drag line completed the diversion channel and cofferdam, and on February 24 water was turned through the

Advance crop report, Okanogan project, Washington.

Crop.	Area (acres).	Unit of yield.	Yields.			Values.	
			Total.	Average (per acre).	Per unit of yield.	Total.	Per acre.
Alfalfa.....	561	Ton.....	1,078	1.9	\$15.00	\$16,177	\$28.84
Apples.....	4,129	Box.....	1,280,958	310	1.20	1,537,150	372.26
Corn.....	4	Bushel.....	125	31½	1.35	168	42.19
Corn fodder.....	14	Ton.....	38	2½	10.00	380	27.14
Fruit, small.....	45	Pound.....	239,610	5,326	.05	11,980	266.22
Garden.....	122					16,720	137.05
Hay.....	74	Ton.....	93	1¼	15.00	1,400	18.92
Pasture.....	48					452	10.10
Peaches.....	13	Pound.....	94,000	723	.02	1,890	144.61
Pears.....	62	do.....	349,350	5,634	.02½	7,860	126.77
Prunes.....	11	do.....	19,500	1,772½	.05	975	88.64
Potatoes (white).....	27	Bushel.....	3,433	127	.90	3,090	114.44
Miscellaneous.....	54					8,875	139.00
Less duplicated areas.....	334						
Total cropped.....	4,840	Total and average.....				1,607,140	332.00
Nonbearing orchard.....	402						
Young alfalfa.....	33						
Miscellaneous.....	295						
Total irrigated.....	5,570						
		Areas.	Acres.		Farms.	Per cent of project.	
		Total irrigable area farms reported.....	6,652		447	86	
		Total irrigated area farms reported.....	5,570		447	73	
		Under water right applications.....	4,650		411	61	
		Vested rights.....	920		36	12	
		Total cropped area farms reported.....	4,840		439	63	

opening in the completed section of the dam, and work was commenced on excavating the foundation for the north portion of the dam. At the Willwood bridge the contractor completed the erection of the structure, and Government forces during the period February 6 to 10 excavated 2,000 cubic yards of material from the north approach with a class 9½ gas Bucyrus drag line. On the Garland and Frannie divisions small crews were employed on repairing excavation machinery in anticipation of spring work. The concrete reinforcement around the north 42-inch emergency valve at Shoshone Dam was placed and the wooden ball closing the corresponding 42-inch valve through the base of the dam was pulled without difficulty. The remodeling of camp buildings and installation of several septic tanks at the dam camp were also completed, thus bringing power plant construction practically to a close.

Twenty-nine cars of alfalfa meal, 47 cars of alfalfa hay, 7 cars of wheat, 18 cars of potatoes, and 1 car of beans were shipped from the project during the month.

The Shoshone power plant was operated without trouble; 158,500 kilowatt hours were generated, of which 14,600 kilowatt hours were delivered to commercial connections and 61,240 kilowatt hours put to Government uses.—*J. S. Longwell.*

INDIAN PROJECTS, MONTANA.

BLACKFEET PROJECT.

February weather was such that no field work of any kind could be done.

Office work consisted of preparing annual project history, other routine reports, and the preparation of plans and estimates for the coming season's work.—*R. M. Snell.*

FLATHEAD PROJECT.

February was marked by cold weather in the first part and normal temperatures during the latter part of the month. No severe storms occurred and working conditions were generally good.

At the Hubbard Dam 345 cubic yards of concrete were placed to fill up a crevice in the foundation. Hauling of cement and lumber, cutting of logs for timber, and enlargement of the flume to take the spring flood by the dam site were in progress. A contract was let for sawing and splitting 1,000 ricks of wood for fuel. An outfit was received for drilling grouting holes in the bedrock foundation of the dam.

At the Tabor feed canal the steam shovel advanced 1,920 feet through hard digging and excavated 12,300 cubic yards of material, largely class 2 and 3. Cutting of fuel and clearing of right of way was in progress. Three log bridges were built across the canal. Building of roads to a new camp site, which will be the base of operations for the year 1923, began at the end of the month. The market for hay at prices of \$15 to \$20 per ton, baled, f. o. b. shipping points, was steady and a large amount of surplus hay was shipped out, mostly to western points.

Meetings of water users for the purpose of initiating the formation of irrigation districts were held on all parts of the project. The organization of communities to cooperate with the Northern Pacific Railway in listing land bargains and aiding prospective settlers to obtain land was begun, with prospects of successful cooperation.

Meetings of farmers in connection with the contracting of seed pea acreage were held on the Camas and Jocko divisions and contracts for a small acreage are assured.

Arrangements have been made for the immediate shipment of a large number of dairy cattle into the Mission Valley through a local mutual dairy loan association.

The landowners of the former Crow division, near Ronan, have petitioned for beginning of construction of the lateral system for that part of the project, realizing the necessity of the growing of hay crops and the promotion of the dairy industry.—*C. J. Moody.*

FORT PECK PROJECT.

Weather conditions for February were about normal. Low temperatures prevailed from the 1st to 22d, with a severe blizzard on the 12th and 13th, which caused some damage to live stock. Warmer weather during the latter part of the month resulted in some run-off and melted the snow on the open ranges so that the stock have had free grazing.

Office work consisted of the preparation of the project history and of reports and work budgets for the several divisions.

Live stock were in fair condition. Range stock were in a weakened condition and will not be able to stand any very bad storms without heavy loss.—*E. L. Decker.*

GENERAL OFFICES.

Washington office.—Director Davis was in charge of the office the entire month.

Assistant Director Blen was in the office the entire month, except for a few days attending the meeting of the board of directors of the American Association of Engineers in Chicago.

Chief Counsel Hamele was in the office the entire month.

Statistician Blanchard visited El Paso during the month in connection with the development campaign on the Rio Grande project. He also delivered a number of illustrated lectures on the work of the service.

Purchases during the month amounted to \$3,590.22, and the value of requisitions filled and sales from the storehouse to \$3,215.60.

Publications issued during the month comprised 114 copies of the annual reports and 287 miscellaneous publications. The 31 mimeograph jobs amounted to a total run of 17,065 sheets.

The number of inquiries concerning the service and opportunities for settlement answered by the settlement and information section amounted to 686. At the close of the month the total number of inquiries from ex-service men concerning opportunities on the land totaled 196,400.

The photographic laboratory turned out work during the month to the value of \$265.08, distributed as follows: Washington office, \$107.35; field, \$106.48; sales, \$51.25.

During the month 933 names were added to the RECLAMATION RECORD mailing list and 90 dropped, making a total mailing list of 16,284 names.

Visitors to the office included the following: Messrs. Raymond, Craft, and Seger in connection with the proposed contract with the farmers' irrigation district adjoining the North Platte project; L. W. Hall, formerly an engineer in the Reclamation Service; District Counsel Joseph N. Beardslee, of Mitchell, Nebr.; James T. Whitehead, president of the North

Platte Valley Water Users' Association; W. P. Dale, president of the Uncompahgre Valley Water Users' Association; Karl F. Keeler, of the Strawberry Valley Water Users' Association; D. W. Cole, formerly project manager of the Boise project; Judge R. E. Sloan, ex-governor of Arizona; and Messrs F. A. Reid, president, and C. C. Cragin, general manager, of the Salt River Valley Water Users' Association, in connection with the Paradise Verde hearings, which were held before the Secretary on February 21.

Denver office.—The chief engineer was in Washington, D. C., on February 1, returning to Denver on February 13. On the 17th he left for a western trip and by the end of the month had visited the Boise, Baker, and Umatilla projects. Assistant Chief Engineer R. F. Walter left Denver on February 18 for the Umatilla project, where he joined a board to consider matters pertaining to the proposed McKay dam. He returned to the Denver office on the 27th. Engineer James Munn left on February 18 for a visit to the Riverton and North Platte projects, returning on the 26th. Messrs. Walter, Munn, and Savage left Denver the evening of February 28 for North Platte, Nebr., for a field investigation in connection with the review being made by them of the recent report on the Lower Platte secondary investigations.

The principal work accomplished in the designing section consisted of the following: Continued studies on drainage and grouting; continued work on design of drum gates, and reached decision on main details, Boise project; partially prepared designs for Falls Creek crossing, Tabor feed canal, Flathead project; completed detail designs for gate operating house and appurtenant machinery for Orchard Mesa Siphon, Grand Valley project; prepared designs for submerged orifices, Langell Valley division; prepared preliminary designs and estimates for constant radius, variable radius, and multiple arched dam for Horsefly site, Klamath project; completed detail designs for automatic wasteways for Vandalia Canal, stations 1728 and 1681, Milk River project; revised and completed detail designs for Horse Creek wasteway, Fort Laramie Canal; checked for approval and publication specifications and designs for Tunnel No. 3, Fort Laramie Main Canal, North Platte project; revised designs for concrete canal lining and transitions, Wyoming Canal; partially prepared detailed designs for check, bypass, and forebay structure at intake to Pilot Butte power plant, Wyoming Canal, Riverton project; completed designs for mechanical hoisting equipment for headgates and sluice gates for Willwood Dam; revised detail designs of Willwood diversion dam, Shoshone project; prepared details of metal work required to be set in concrete, Tieton spillway; completed new pencil designs for drum gates; and design of trash rack and racks over spillway control gate inlets, Yakima storage project.

The principal work accomplished in the electrical section consisted of the following: Final designs of the foundations for the Black Canyon pumping plant were started, Boise project; the detail designs of the emergency gates for the outlet works at Hubbart Dam were revised to conform to the changes in the design of the dam, Flathead project; detail drawings for concreting the present 72-inch penstock were forwarded to the project; designs for the new 78-inch penstock between power plant and dam were prepared as far as possible with the data on hand, Newlands project; detail designs of the balanced needle valve installation at Tieton Dam were started, Yakima storage project; final drawings for the electrification

of the Valley drainage plant were practically completed; revised drawings for the connection at the B Lift pumping plant of the 33,000-volt transmission line from the Valley drainage plant were forwarded to the project, Yuma project; preliminary estimates and drawings for Canyon Divide power plant, Mosida pumping plant, and transmission line from Canyon Divide power plant to the Mosida and Jordan pumping plants were prepared, Salt Lake Basin investigations; all drawings for the electrification of two drag-line excavators on the Shoshone project and two on the Sun River project were completed.

Among the more important matters which received consideration in the legal section were: Permanent reduction of irrigable areas under water-right applications and adjustments of payments thereon due to appropriation of certain areas for drainage right of way within Truckee-Carson irrigation district, Newlands project; application for appropriation of water by irrigation district No. 1, Carson Valley division, Newlands project; request of Sunnyside irrigation district to increase size of farm units from 40 to 80 acres, Yakima project; right of way for Union Pacific Railway Co. over certain lands in Gering and Fort Laramie irrigation district, Fort Laramie division, North Platte project; contract with Canyon Power Co. for lease of Lahontan power plant and settlement of water-right dispute, Newlands project; contract with city of Fallon, Nev., for removal of Scott ditch within city and granting franchise to United States by city for transmission line, Newlands project; draft of contract with city of Sunnyside, Wash., for payment of street improvements in front of Government property, Yakima project; proposed contract with town of Somerton, Ariz., for irrigation water, Yuma project; and proposed contract with town of Deaver, Wyo., for water for domestic and municipal purposes, Shoshone project.

An average of 398 letters per day was received in the mails and files section; the disbursing section handled 883 vouchers, involving an expenditure of \$210,190.93; in the purchasing section 352 advertisements were issued; 488 vouchers prepared, involving a net expenditure of \$133,259.17; 3,500 rates were furnished for basing purposes in awarding orders and making transfers; and 404 bills of lading were furnished for the movement of materials.

Recent Service Orders.

CIRCULAR LETTERS.

No.

- 1194. Form of contract with railroad company for spur track.
- 1195. List of vessels of the United States Reclamation Service.
- 1196. Monthly revision of Reclamation Record mailing list.

GENERAL LETTERS.

- 229. Changes in organization sheets, fiscal year 1923.

Frank M. Kerr, premier corn grower on the Lower Yellowstone project, states that "In 1920 we had 900 acres of corn in this county; in 1921 there were 3,000 acres; in 1922 there were 15,000 acres; and in 1923 the corn acreage will be well above 20,000."

RESULTS OF IRRIGATION, 1922.**Umatilla Project, Oregon.****VALUES CREATED.**

Value of farm lands and improvements on project estimated by the owners at close of 1922.....	\$3,520,928
Value of live stock.....	390,092
Value of farm equipment.....	160,551
Total.....	4,071,571

Assessed valuations, estimated on the best information available.....	2,500,000
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CROPS.

Value of crops in 1922.....	486,258
Value of crops produced since 1912.....	3,190,258

SHIPMENT OF AGRICULTURAL PRODUCTS IN 1922.

	Carloads.
Alfalfa hay.....	1,244
Alfalfa meal.....	8
Melons.....	1
Apples.....	4
Potatoes.....	3
Wheat.....	10
Honey.....	2
Wool.....	2
Sheep.....	39
Cattle.....	7
Hogs.....	7
Horses and mules.....	18
Total.....	1,345

WHOLESALE PURCHASES OF MANUFACTURES DURING 1922 (ESTIMATED).

Automobiles and accessories.....	\$100,000
Hardware, crockery, farm machinery, etc.....	100,000
Dry goods, groceries, etc.....	200,000
Tobacco, cigars, candies, etc.....	30,000
Drugs, toilet articles, etc.....	15,000
Lumber, cement, etc.....	125,000
Total.....	570,000

OTHER SIGNIFICANT STATISTICS, 1922.

Number of farms.....	558
Number of towns.....	4
Population in towns.....	1,280
Population on farms.....	1,613
Acres supplied with water.....	13,273
Acres in crop.....	12,391
Public schools.....	6
Churches.....	8
Newspapers.....	3
Banks.....	1
Industries:	
Creamery.....	1
Cheese factory.....	1
Alfalfa mill.....	1
Railroad roundhouse and car-repair shops.....	1

THE JUNK PILE.**By Everybody.**

Well, now, come on everybody and help make a real live column out of this. As indicated by the heading, this column will take most anything that will pass the postal authorities and will be devoted to lively items of interest about anything, anybody, and from anywhere. As most junk piles generally have something of value, if you just keep on looking you will sure find some good things here.

The editor has promised to run this column as close as possible to the page giving the "Administrative Organization," so it will be the second thing noticed in the RECORD. Who's Who on reclamation projects will be welcomed, and they are not to be limited to any class or locality; also any good yarns with local color, such as a description of the fall of Mr. Weymouth from a bridge at Jackson Lake Dam, which, while painful to him, was amusing to the onlookers, and it also shows the "higher ups" don't always know everything, as he went around for two days without knowing he had two broken ribs. Another incident that happened there was when Mrs. Banks tried to pull a large running belt from a pulley with her skirt and didn't succeed, as was very noticeable, as skirts at that time were more conspicuous than now, and if one was lost it was missed right away.

Then the one about Mr. Henny getting up early on a Pullman and getting off wearing one of his own shoes and one belonging to another passenger, and the worst of it was that he didn't discover the shoes were not mates until after wearing them all day.

The editor of the RECORD requested an article from the chief accountant on the accounting work, written in words of one syllable so that it could be understood even by an engineer, and he was promptly told "It can't be did," and now we don't know whether to place the blame on the chief accountant or on the engineers, but if any of the accountants in the service would like to try it, send it along.

Here is another. No doubt many of you remember Mr. Sargent, who was employed on field investigation on the Uncompahgre project in the early days. He received a telegram from his wife advising she would arrive in Montrose the next day at 2.20 p. m., and of course he made arrangements to meet her. The next day he drove to town, but returned to camp about train time, and one of his assistants, being surprised to see him back so early, inquired if Mrs. Sargent was not coming. With a look of consternation he said, "My heavens, I knew there was something I had to attend to."

Now, everyone send in an item, and if you do, as Mitchell, of the Lower Yellowstone, says, "I don't want to brag, but," this column will make Hamele, Blanchard, and Littlepage go some to hold their readers.

ADMINISTRATIVE ORGANIZATION.

DEPARTMENT OF THE INTERIOR.

Hon. HUBERT WORK, Secretary of the Interior.
 EDWARD C. FINNEY, First Assistant Secretary.
 D. W. DAVIS, Special Assistant Secretary.
 FRANCIS M. GOODWIN, Assistant Secretary.
 EDWIN S. BOOTH, Solicitor for the Interior Department.
 EBERT K. BURLEW, Administrative Assistant to the Secretary.
 JOHN H. MCNEELY, Assistant to the Secretary.
 JOHN HARVEY, Chief Clerk and Superintendent of Buildings.

U. S. RECLAMATION SERVICE.

WASHINGTON, D. C.

Arthur Powell Davis, director; Morris Bien, assistant director; Ottamar Hamels, chief counsel; J. B. Beadle, director's assistant; C. J. Blanchard, statistician; Hugh A. Brown, editor and office assistant; C. A. Bissell, engineer; J. M. Luney, chief accountant; C. A. Lyman, repayment accounting; Miss H. A. Fellows and Raymond Depue, fiscal agents; C. H. Fitch, chief clerk; Emmet Carr, purchasing agent; G. W. Numbers, appointment clerk; H. N. Bickel, Yakima, Wash., and W. F. Kubach, Denver, Colo., examiners of accounts.

DENVER, COLO.

F. E. Weymouth, chief engineer, Wilda Building, Denver, Colo.; R. F. Walter and C. P. Williams, assistant chief engineers; Miss L. H. Melsel, secretary to the chief engineer; J. M. Gaylord, electrical engineer; J. L. Savage, designing engineer; James Munn, engineer; W. A. Meyer, chief clerk; A. McD. Brooks, purchasing agent; Harry Caden, fiscal agent.

FIELD LEGAL OFFICES.

Boise, Idaho.—B. E. Stoutmyer, district counsel. Projects: Boise, Minidoka, King Hill, and Jackson Lake Enlargement.

Denver, Colo.—Law section office of chief engineer: R. M. Patrick and Armand Offutt, district counsel.

Las Cruces, N. Mex.—Mark B. Thompson, attorney. Projects: Rio Grande, Carlsbad, and Hondo.

Helena, Mont.—E. E. Roddis, district counsel, Helena, Mont. Projects: Blackfoot, Flathead, Fort Peck, Huntley, Milk River, St. Mary Storage, Sun River, North Dakota Pumping, Lower Yellowstone, and Shoshone.

Mitchell, Nebr.—J. N. Beardslee, district counsel. Projects: North Platte, Belle Fourche, and Riverton.

Montrose, Colo.—J. R. Alexander, district counsel. Projects: Grand Valley, Uncompahgre, and Strawberry Valley.

Portland, Oreg.—H. L. Holgate and D. G. Tyree, district counsel. Projects: Yakima, Okanogan, Umatilla, Klamath, and Baker.

San Francisco, Calif.—P. W. Dent and Brooks Fullerton, district counsel, 349 Pacific Building. Projects: Salt River, Yuma, Orland, and Newlands.

PROJECT ORGANIZATION.

Belle Fourche Project.—B. E. Hayden, project manager, Newell, S. Dak.; R. C. Walber, chief clerk.

Boise Project.—J. B. Bond, project manager, Boise, Idaho; Walter Ward, engineer in charge construction Black Canyon Dam; E. R. Mills, chief clerk; C. F. Weinkauff, fiscal agent.

Carlsbad Project.—L. E. Foster, project manager, Carlsbad, N. Mex.; V. L. Minter, chief clerk and fiscal agent.

Grand Valley Project.—S. O. Harper, project manager, Grand Junction, Colo.; W. J. Chiesman, chief clerk; A. H. Hall, fiscal agent.

Huntley Project.—A. B. McGinness, project manager, Ballantine, Mont.; G. H. Bolt, chief clerk; Miss M. C. Simek, fiscal agent.

King Hill Project.—A. M. Rawn, project manager, King Hill, Idaho; T. W. Hause, chief clerk; W. S. Gillogly, fiscal agent.

Klamath Project.—H. D. Newell, project manager, Klamath Falls, Oreg.; N. G. Wheeler, chief clerk; G. R. Barnhart, fiscal agent.

Lower Yellowstone Project.—L. H. Mitchell, project manager, Savage, Mont.; E. R. Schepplmann, chief clerk.

Milk River Project.—G. E. Stratton, project manager, Malta, Mont.; H. A. Parker, engineer; E. E. Chabot, chief clerk; G. S. Moore, fiscal agent.

Minidoka Project.—Barry Dibble, project manager, Burley, Idaho; Dana Templin, engineer; E. C. Diehl, chief clerk; Miss A. J. Larson, fiscal agent; F. A. Banks, engineer, American Falls, Idaho.

Newlands Project.—J. F. Richardson, project manager, Fallon, Nev.; A. W. Walker, engineer; G. B. Snow, chief clerk; Miss Ethel M. Simmonds, fiscal agent.

North Dakota Pumping Project.—W. S. Arthur, project manager and chief clerk, Williston, N. Dak.; H. C. Melasas, fiscal agent.

North Platte Project.—Andrew Weiss, project manager, Mitchell, Nebr.; H. W. Bashore, engineer, Fort Laramie Division; T. W. Parry, irrigation manager; J. R. Ummel, chief clerk; Mrs. A. L. Truax, fiscal agent.

Okanogan Project.—Calvin Casteel, project manager, Okanogan, Wash.; W. D. Funk, chief clerk and fiscal agent.

Orland Project.—R. E. C. Weber, project manager, Orland, Calif.; E. T. Eriksen, engineer; C. H. Lillingston, chief clerk and fiscal agent.

Rio Grande Project.—L. M. Lawson, project manager, El Paso, Tex.; C. A. Peavey, chief clerk; L. S. Kennicott, fiscal agent.

Riverton Project.—H. D. Comstock, project manager, Riverton, Wyo.; R. M. Conner, engineer; G. H. Murphy, chief clerk; W. J. Fogarty, fiscal agent.

St. Mary Storage Division.—R. M. Snell, project manager, Browning, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Salt River Project.—Being operated by the Salt River Valley Water Users' Association; C. C. Cragin, general superintendent and chief engineer, Phoenix, Ariz.

Shoshone Project.—J. S. Longwell, project manager, Powell, Wyo.; J. R. Iakisch, engineer; C. M. Jump, superintendent of irrigation; W. F. Sha, chief clerk; Miss L. C. Drinkwater, fiscal agent.

Strawberry Valley Project.—W. L. Whittemore, project manager, Provo, Utah; J. E. Overlade, chief clerk and fiscal agent.

Sun River Project.—G. O. Sanford, project manager, Great Falls, Mont.; H. W. Johnson, chief clerk; F. C. Lewis, fiscal agent, G. A. Benjamin, irrigation manager, Fairfield, Mont.

Umatilla Project.—H. M. Schilling, project manager, Hermiston, Oreg.; G. C. Patterson, chief clerk and fiscal agent.

Uncompahgre Project.—L. J. Foster, project manager, Montrose, Colo.; R. B. Smith, chief clerk; F. D. Helm, fiscal agent.

Yakima Project.—J. L. Lytel, project manager, Yakima, Wash.; R. K. Cunningham, chief clerk; J. C. Gawler, fiscal agent; M. D. Scroggs, superintendent of irrigation, Sunnyside, Wash.; J. S. Moore, superintendent of irrigation, Route 6, Yakima, Wash.; F. T. Crowe, engineer in charge construction Tieton Dam, Rimrock, Wash.; C. F. Gleason and W. C. Christopher, engineers; V. G. Evans, chief clerk; C. B. Funk, fiscal agent.

Yuma Project.—P. J. Preston, project manager, Yuma, Ariz.; R. M. Priest, superintendent of construction; D. C. McConaughy, engineer, Yuma Mesa Division; C. A. Denman, chief clerk; E. M. Philbaum, fiscal agent.

INDIAN PROJECTS.

Blackfoot Project.—R. M. Snell, project manager, Browning, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Flathead Project.—C. J. Moody, project manager, St. Ignatius, Mont.; S. A. Kerr, engineer in charge construction Hubbard Dam; J. M. Swan, chief clerk; J. P. Siebenauer, fiscal agent.

Fort Peck Project.—E. L. Decker, acting project manager, Poplar, Mont.; Henry Berryhill, chief clerk and fiscal agent.

The Reclamation Record

Issued Monthly by the RECLAMATION SERVICE, DEPARTMENT OF THE INTERIOR, Washington, D. C.

VOLUME 14, No. 4

Price: 75 cents per year

APRIL, 1923

COOPERATION BETWEEN DEPARTMENTS OF INTERIOR AND AGRICULTURE.¹

By Hon. Hubert Work, Secretary of the Interior.

THERE is so much in common between the Department of Agriculture and the Department of the Interior that it gives me the greatest pleasure to meet so many hundreds of those employed with the Department of Agriculture.

The two departments are accomplishing much by cooperation and have many working points of contact, so that certain duplications have heretofore appeared to be unavoidable, and many separations of now joined services would appear to warrant the reallocation of departmental responsibilities proposed by President Harding to the Sixty-seventh Congress. When the President speaks for the Department of the Interior, as he does in this instance, it is my pleasure to subscribe to his views. For more than two years he has considered with mature judgment a program which is designed to correlate the administration of governmental functions, and I quite approve those affecting the Department of the Interior. No student of economics will dispute the incalculable benefits to be accrued through a logical reallocation of Government services. The Interior Department and the Department of Agriculture are units of a great Government, not miniature governments in themselves, and therefore both departments are obligated to contribute through mutual cooperation to the successful administration of the Government as a whole.

The lost motion and time expenditure incident to duplication or overlapping does not make for intensive organization, the lack of which is a weakness of the Government service. One department should not be dependent on another for an incidental service because not prepared to do it alone. That service should be the responsibility of the department best equipped to render it.

Related services should, generally speaking, be wholly in one department, and the line between interlocking services should be clearly defined so that equipment, employees, bureaus, and divisions of the Government departments may not be duplicated. I

am a believer in centralization of authority and of individual responsibility throughout the service.

To illustrate: A vital concern of the Interior Department is reclamation of land, particularly in the arid regions, by irrigation. The first steps when reclamation by this method is contemplated should be taken by the Agricultural Department—a study by soil analyses to determine what crops the land will grow, the probable production, together with the marketing competition when crops have matured. If favorable report warrants, the Interior Department should then study water supply available without storage during the crop season, or, if the natural flow is inadequate, to estimate the amount and cost of impounding water for the growing season, survey ditches, locate and construct dams and reservoirs, and compute acre cost and total expenditure. With these scientific data available, supplementing those already supplied by the Agricultural Department, corporate funds preferably, working with this knowledge, might be interested. Certainly prospective settlers would be intelligently advised in advance.

If the Government elected to construct, the Interior Department necessarily would complete the irrigation facilities and continue its responsibilities to the farmers for perfect title and water supply, but the Agricultural Department should then assume responsibility for instruction on farming and marketing, at least until the Government had been reimbursed and its obligations to water users discharged. It would appear that all Government irrigation projects should be put under the control of the water users at the earliest possible moment. Bureaucratic government has never appealed to the American people. It is offensive, often unavoidably inefficient, and should be withdrawn from community projects without unnecessary delay. Experience has demonstrated that irrigation to be successful must be operated by those using the water. The Agricultural Department's contact should then be renewed for purposes of instruction in farming economics and should continue after the Department of the Interior had been relieved from its obligations. Reclamation by irriga-

¹ Speech delivered by Secretary Work before the Department of Agriculture motion-picture show, Washington, D. C., April 13, 1923.

tion is essentially a joined service by the two departments, each having clearly defined lines of division.

It can not be broadly stated that because prices of farm products do not represent cost production at this time cultivated acreage should be arbitrarily limited or restricted geographically.

Farmers nearest good eastern markets have tremendous advantage, but those near the Pacific coast are at the gateway to the Orient. Economic writers estimate that within five years California, Oregon, and Washington can not feed their people from their own farm products unless their production acreage is increased. The grain States of Iowa and Kansas, for illustration, which are midway to either ocean, should not say that new land, far distant, may not be brought under cultivation for local consumers or for foreign markets through more nearly adjacent water routes which otherwise would compel a supercharge for freight. These States do, however, have a right to insist that economic laws be considered before new land is brought under cultivation, and that farmers on this new land receive no financial favors from the Government not received by themselves. Under the new rural credits law the Government secures loans for all farmers and expects them to meet their obligations. The advancement of money for irrigation projects is nothing more than a loan and must likewise be repaid.

Farmers must compete in the markets precisely as other industries do, and the question of transportation is a fundamental factor in the marketing of farm products. These are questions the two departments must study together, for they have to do with the food supply not of this year and our own people alone but for many years in the future and for other nations as well. There is no longer any frontier in the United States. We are all one people, having a common interest and obligation to the Government, and I shall ask the Secretary of Agriculture to lend the good offices of his most scientific, practical, and effective department to appraise soil fertility and markets in advance of our reclamation commitments and to aid our settlers in profitable farming.

There can be no objection to taking tax money raised in the East to develop land in the West, providing it will be repaid, with interest, and taxable property thereby increased. Eastern people, incorporated, have been doing it for half a century.

Production was overstimulated during the war. Foreign countries can not buy from us as they once did. The old law of supply and demand continues to influence prices as it always has, but transportation often affects farm profits. The business acumen of farmers has been stimulated by the past depression. They now study production and marketing, each for himself and collectively, and are profiting by it.

One summer's drought such as has occurred in the memory of those now living would put this most pros-

perous country in want. The population of our cities is much greater than that of the rural districts. Our margin of safety between plenty and famine is no greater in grain than it is in coal, but our expanding markets and rebuilding transportation facilities are opening up a bright future for the farmers, which will be further broadened when their old customers overseas are again in funds. Besides, now that every employable American is already at work and his buying power increasing, the farmer has much before him to inspire hope.

I referred at the beginning of my talk to the points of contact between our two departments, which by the way are many. I believe some one has attempted to count them up and his estimate is that there are more than 30 distinct points where the work of the Agricultural and Interior Departments touch.

It is interesting to note a few in which the several activities of our departments would be affected by the proposed reallocation of departments.

Reforestation is properly placed now in the department skilled in soil analysis, tree culture, parasite control, horticulture, and forest protection. Reforestation is forest reclamation. The forests are nature's conservation agencies. They hold snow and rainfall, preventing soil erosion and destructive floods, but the border line between reforestation and forest preservation is too narrow for purposes of division.

The reindeer of Alaska—180,000 in number—are a care of the Interior Department under the Bureau of Education, but their place in a teaching faculty has not been determined. They properly belong in the department skilled in animal husbandry. The live stock of the Indians has its place in their livelihood and training as farmers, but its breeding up and its eradication of diseases are clearly within the confines of the Agricultural Department.

I have not had opportunity to consult with the Secretary of Agriculture on these lines I have been discussing with you. I am new to my department while he has been in the far West for several weeks, where, incidentally, he has missions to perform for my department, but we are long-time personal friends; I know the trend of his mind and feel assured that we will not be far apart in our conclusions bearing on the important services our respective home-making departments should render to the Government.

By the last week of March about three-fourths of this season's lettuce movement from the Imperial Valley had been completed, with many shipments still to be made during April.

Approximately 5,950 carloads of lettuce had been reported from Imperial Valley to March 17, compared with only 2,900 to the corresponding time last season.

FIELD RECLAMATION COMMISSIONER APPOINTED TO ASSIST SETTLERS.

IN furtherance of his policy for the improvement of the reclamation projects along business and agricultural lines, paying more attention in future to aiding and cooperating with farmers on the projects in the matter of successful agriculture, Secretary Work has appointed Miles Cannon, former commissioner of agriculture of the State of Idaho, to the post of field reclamation commissioner, Department of the Interior, with headquarters to be later established in one of the Western States.

The work to be carried out by the new commissioner of reclamation is not to conflict with or duplicate work already being carried on by the engineering branches of the Reclamation Service nor the work of the Department of Agriculture, but is rather to be in cooperation with and furtherance of these lines of work, in the interest of settlers occupying lands upon the reclamation projects. The work is also to be in cooperation with the various States in which reclamation projects are situated.

Special consideration of the various problems arising on or affecting the projects by an experienced man in actual touch with conditions upon the ground and working in harmony with existing State and governmental organizations will, it is believed, mark the beginning of cooperation with the Agricultural Department, and thereby eliminate possible duplication, and enable the farmers not only to raise better and more diversified crops, but to apply modern methods to handling, marketing, and realizing upon crops produced, while at the same time effecting economies in the cost of reclamation and cultivation.

Commissioner Cannon, Special Assistant Secretary Davis, and Director Arthur P. Davis have left for a visit to the various reclamation projects, with a view to inaugurating the new work.

In connection with the appointment of Mr. Cannon, Secretary Work has sent the following letter to Director Davis and the various project managers:

THE SECRETARY OF THE INTERIOR,
Washington, April 13, 1923.

The Director of the Reclamation Service and Project Managers, Reclamation Projects, Department of the Interior.

GENTLEMEN: I have to-day appointed Hon. Miles Cannon to the post of field reclamation commissioner of this department, with headquarters to be later established in one of the reclamation States.

Mr. Cannon is the direct representative of the Secretary of the Interior in a work which I have undertaken for the improvement of Government reclamation projects along business and agricultural lines. His work is not to conflict with or duplicate the engineering work now being carried on by existing reclamation forces, nor with the work of other bureaus or departments, but is to be, so far as same touches your

work or that of others, in cooperation in producing beneficial results.

Briefly, it is the purpose to coordinate various agricultural activities, aid the farmers in raising better and more diversified crops, in applying modern methods in handling, marketing, and realizing upon crops produced, to effect economies wherever possible, and to in every way improve not only the condition of the water users on the projects but the administration of the projects by this department.

To this end Commissioner Cannon must have your full and hearty cooperation and confidence, and is to be given by you every aid and assistance. He will visit the several projects personally, and he will be in touch with both the project managers and the water users personally and by correspondence. Hearty cooperation with him will render your work less difficult and more successful and can not fail to benefit the Government and the water users.

The results of this policy, if effectually carried out, can not fail to be of direct benefit to all concerned in existing projects and to contribute to the extension of new reclamation work in the Western States.

Respectfully,

HUBERT WORK, *Secretary.*

Lessen the Waste of Water.

One of the most common sources of loss of water is poor preparation of the surface. When the soil is irrigated by flooding from field laterals an uneven surface causes needless waste of water, extra labor in spreading it over the surface, and smaller yields. The water flows into the low places, which receive too much and may become water-logged, while the high places are left without water and the crop thereon is dwarfed. The surface between field laterals should be so evenly graded that water will flow in a thin sheet over the entire surface, the excess being caught up by the lower lateral.

Another common cause of waste is the lack of attendance. Water is often turned on a portion of a field and permitted to run without attention for hours and even days. On some farms the irrigators look after the water for 10 hours and turn it loose for the balance of the day. Under this practice the low places receive too much, the high places little or none, and a large part flows off the field to the injury of the roads and adjoining farms.

Too shallow and too frequent irrigation is another source of waste. Wetting the surface and neglecting to cultivate it afterwards may result in the loss by evaporation of three-fourths of the water which is applied in this way. For most plants, and for all deep-rooted plants in particular, the ground should be so prepared that water would readily percolate to a considerable depth beneath the surface and enough water should be applied to moisten the subsoil. However, light, open soils retain little moisture, and with such soils light, frequent irrigations are necessary.

NATIONAL RECLAMATION PROBLEMS.

By Hon. F. W. Mondell, Director War Finance Corporation.

THE time has now arrived when there should be a general study of conditions on the Government reclamation projects and a readjustment, in a manner which will enable the industrious and well-meaning settler to meet his obligations at all times and to place the Government reclamation enterprises on a basis of permanent prosperity.

That was my general summing up of the situation as to national reclamation projects in my last speech in Congress, and it expresses a growing conviction in the mind of men who are well informed concerning the progress which has been made during 20 years of experience in national reclamation.

Since the passage of the reclamation act of June 17, 1902, there has been a high standard of efficiency and integrity; many of the works erected are of a monumental character and among the finest engineering accomplishments of man. On the other hand, from the viewpoint of the farmer, the picture is not quite so flattering, because of the fact that there has been little immediate or direct oversight of the human, financial, or economic problems as affecting the individual settler.

Criticism can not properly be made of the Reclamation Service for failure to look after the individual affairs of the settlers on the projects. Congress took the attitude that it was not desirable for the Government to attempt supervision over the settler or to any considerable extent over the settlement or cultivation of the reclaimed lands. No selection of settlers was allowed under the terms of the reclamation law. The rule of "First come, first served" was rigidly followed. No requirement was made as regards financial or physical ability or as to skill and experience as a farmer.

Notwithstanding the difficulties incident to the development of new farms under irrigation, the settlers on these projects have, in the main, been prosperous and successful. The last two years of exceptionally low prices and of high transportation and other costs have created a condition under which some of the landowners have found it difficult or impossible to meet their payments. Congress has granted temporary relief by extending the time of certain payments. This has made it possible for many settlers to remain who otherwise would have been compelled to leave with what little they could realize from their work and investment. Recently Congress further relieved the situation by providing for the spreading of the deferred payments over the remaining repayment period where this was deemed advisable in the

discretion of the Secretary of the Interior. However, it is essential that something further be done to establish conditions under which permanent prosperity may be assured on these projects.

The whole country has an interest in the settlement of these problems. First, there is the proper concern we have in the individual fortunes of the people directly affected and in the welfare of the communities in which they live; second, the interest which the entire country has in the further extension of reclamation development in providing needed opportunities for home makers.

Some who have not given the matter careful consideration appear to consider the problem comparatively easy. A period of nonpayment has been suggested, to be followed by a greatly extended period in which to meet the cost of construction. One difficulty about this is that it would automatically check development under the present reclamation fund by retarding the flow of repayments. Furthermore, while a long extension of the period of construction repayments might be of assistance to those who now find it particularly difficult to meet their present obligations, this would, in the long run, retard and even prevent the establishment of permanently favorable conditions on the projects. Such arrangements would not create the essential conditions under which the industrious, thrifty settler would find the opportunity to work out his financial salvation. It would neither be good policy from the Government standpoint nor a real kindness to the present landowner to create a condition which would encourage him to capitalize these benefits by increasing the prices of his lands and thus prevent the bringing in of new settlers.

As a basis of any readjustment there should be a writing off of some of the liabilities which are clearly not collectible. It was inevitable in this enterprise, which was the first of its kind undertaken by the Government, that mistakes should occur. Fortunately, the losses are relatively small. On most of the projects the entire expenditure was justified and can and should be repaid. Certain areas on a few projects should be eliminated because of unfavorable conditions of soil and topography, or perhaps a reduction in construction charges is advisable to conform with the present values of the reclaimed lands.

A plan should then be worked out which can be depended upon to create conditions under which landowners can pay out. If there are any who believe that the reclamation fund should not have returned

to it the money which was expended in this development, such people should be brought to realize that this is not the view of the majority of their neighbors who have in good faith cooperated in the effort of the Federal Government to aid them in securing a home.

It should also be remembered that the theory of the Federal reclamation policy was the creation of a real home on an area sufficient for the support of a family. The reclamation policy of the Government did not contemplate tenantry and absentee "landlordism." Any revision of present plans should have in mind wholly the owner of a farm unit who intends to live upon and cultivate his land.

The plan should not, in the majority of cases at least, provide for any considerable suspension of payments. Experience has demonstrated that such a plan would not be wise nor in the long run generally helpful. I doubt if a uniform period of construction payments applicable to all projects would be wise. It would seem more equitable to fix the payments on the basis of the construction costs and the average productivity. It has been suggested that if there is to be any considerable extension Congress would be justified in placing an interest charge on the unpaid balance after a given period, and also that readjust-

ments and reductions might be made with the provision that at least one-half of the construction cost must be paid within a given period, after which the remaining indebtedness should be taken over by the Federal land banks and carried as other farm loans are carried, thus getting the Reclamation Service out of the collection business.

In connection with any readjustment it would be most helpful if the settlers would create organizations under which they could take over the control of the projects. It is an unhealthy symptom to have American citizens dependent on Government agencies rather than on themselves.

Much might be said about the improvement in farming methods which individuals and organizations on the projects might properly undertake. As a director of the War Finance Corporation my attention has been challenged by some splendid results which have been secured through diversified farming, including dairying, under reclamation. After all, the success of these projects, as elsewhere, depends on the adoption of the best possible methods and upon individual economy and industry as much as or more than it does upon the methods which the Government shall pursue in the matter of repayments.

LAND VALUES.

THE value of good plow lands in 1923 is given for the whole United States as averaging \$84.73 per acre. There has been a continuous drop in the average value per acre during the past three years, as noted in the publication of the United States Department of Agriculture, entitled "Weather, Crops, and Markets," for March 17, 1923, on page 251.

Although the value of irrigated lands has not been distinguished from other good plow lands, yet it is probable that the prices of irrigated lands have followed the same course, and the deflations are reflected in the prices of other plow lands. Taking the average of all plow lands, good, poor, and indifferent, the average for the whole United States is stated for 1920 as being \$90.01, dropping in 1921 to \$83.78, then in 1922 to \$69.89, and in 1923 to \$66.53 per acre, as contrasted with the good plow lands which were valued in this year at \$84.73 per acre.

Taking some of the irrigated States, the average value of good plow lands in 1923 is as follows: Arizona, \$132; California, \$166; Colorado, \$75; Idaho, \$93; Montana (mostly dry lands), \$31; Nevada, \$80; New Mexico, \$53; Oregon, \$106; Utah, \$110; Wyoming, \$48.

An interesting comparison with these values is that given by the Federal Farm Loan Bureau, compiled from the appraisals made by Federal farm loan

bank examiners in certain counties in arid States, and representing mainly the irrigated lands. The following table gives by State and county the number of owners of irrigated lands who have obtained loans from the Federal farm loan banks, the number of acres mortgaged, and the valuation per acre placed upon the mortgaged land. This table gives what may be considered as a safe, conservative statement of true values of irrigated lands based upon productive capacity and not upon speculative or sentimental ideas.

Much of the present depression and actual hardship on irrigation projects has arisen from the fact that an excessive valuation has been placed on the irrigated land. This is a result of the activity in making loans during the period of inflation; mortgages have been placed upon some irrigated lands to an extent beyond their productive capacity. The valuation for purposes of taxation has been doubled or trebled during recent years. The present landowners are unable to carry the burden of interest at 8 or 10 per cent or more on the inflated valuation and to meet the heavy taxation requirements.

This condition is shown by the fact that most of the applications for extension of time made in 1922 were by persons who are land poor in the sense that they are holding a larger area of irrigated land than

is cultivated by the average successful farmer and are trying to pay heavy interest and taxes on values which are obviously beyond the productive capacity of the land under the methods of farming they were practicing. Permanent relief can come to many of these people only through cutting down the area of the land to the acreage which skilled farmers find to be most profitable and by improving the methods of farming and of marketing, adopting in this regard the system followed by the good farmers in the neighborhood.

Federal land bank appraisals in the following States segregated by counties, from organization to October 31, 1922.

State.	County.	Borrowers.	Acres mortgaged.	Valuation per acre.
Arizona.....	Maricopa.....	275	19,168	\$171.03
Do.....	Yuma.....	18	1,246	231.86
California.....	Imperial.....	50	5,507	112.34
Do.....	Glenn.....	165	8,703	131.74
Colorado.....	Mesa.....	40	7,950	35.47
Do.....	Montrose.....	8	2,806	29.65
Do.....	Delta.....	54	6,500	53.97
Idaho.....	Ada.....	137	10,471	132.62
Do.....	Canyon.....	284	18,902	138.72
Do.....	Cassia.....	14	3,772	20.41
Do.....	Minidoka.....	61	4,663	131.67
Do.....	Twin Falls.....	412	26,234	84.03
Do.....	Jerome.....	187	12,323	124.14
Montana.....	Yellowstone.....	28	66,901	27.56
Do.....	Blaine.....	448	169,773	14.59
Do.....	Phillips.....	160	51,780	11.16
Do.....	Valley.....	197	61,929	13.98
Do.....	Cascade.....	24	8,180	21.38
Do.....	Teton.....	111	29,313	23.62
Do.....	Richland.....	219	70,098	15.16
Nebraska.....	Scotts Bluff.....	61	19,901	26.71
Do.....	Morrill.....	92	33,883	18.43
Nevada.....	Churchill.....	32	3,153	83.85
New Mexico.....	Dona Ana.....	35	2,711	109.17
Do.....	Eddy.....	70	21,572	24.01
North Dakota.....	Williams.....	439	91,571	23.84
Oregon.....	Umatilla.....	224	42,768	40.33
Do.....	Klamath.....	176	36,790	31.26
South Dakota.....	Butte.....	44	20,086	11.83
Do.....	Meade.....	119	37,586	13.41
Texas.....	El Paso.....	12	1,573	90.39
Utah.....	Utah.....	282	13,202	133.67
Washington.....	Okanogan.....	416	76,306	20.13
Do.....	Yakima.....	945	35,208	174.97
Do.....	Benton.....	497	22,664	122.73
Wyoming.....	Park.....	48	10,176	39.36
Do.....	Big Horn.....	76	11,305	49.04

¹ Since Oct. 31, 1922.

Future prosperity is thus bound up with a recognition of the true value of irrigated land, which in turn rests upon the methods of farming pursued and the skill of the farmer. The land itself has no value other than a prospective or speculative price dependent upon the anticipated improvements in the vicinity. It is given a value by the water which is put upon it and the productive improvement. Such value continues only while the lands are being well handled by the owner or occupant, as irrigated land deteriorates through neglect or misuse.

Emphasis should be placed on the word "productive," because many of the improvements made on

irrigated land do not add to its true value. The providing of conveniences in the way of an attractive house, although desirable, does not add to the real value of the land; also the acquisition of implements or materials which are not absolutely needed. Taking, therefore, the original or speculative value of the land at, say, \$5 per acre, adding to this a cost of reclamation, providing water and leveling the soil of, say, \$95, the land itself may be brought to a productive value of \$100, assuming that the water is paid for. Unfortunately, land of this kind on which the water has not been paid for has been sold or mortgaged at prices above those given in the above tables, ranging up to \$150, \$200, or even more per acre, with corresponding disappointment and even hardship.

Permanent prosperity can come to the irrigated areas only when true values are recognized and adjustments of debts, taxes, and other obligations are made to meet these true values.

Plan Your Farming and Get Your Creditors to Cooperate.

IN the relief act of February 28, 1923, as well as in the preceding act of March 31, 1922, it is required that the applicant for extension of time of payment shall show to the Secretary of the Interior by a detailed verified statement an apparent ability to meet the deferred charges; also that relief may be extended only to an owner whose land is actually being cultivated. In the instructions approved by the Secretary on March 7, emphasis is placed on the fact that the applicants for relief should make showings of their plans of cultivation, and if the plan is defective they will be advised to change it; and the nature of the relief given will depend largely upon their cooperation in this matter.

Provision is made in the form of application for relief for a description of the farming system which has been practiced and of that which the applicant proposes to practice during 1923 and 1924.

More than this, the applicant is required to make some showing regarding the burden which he is carrying in connection with other debts. One of the important details brought out by a study of the statements filed by 2,000 or more applicants in 1922 was that many, if not most, of these are land poor, and that practically all are so heavily loaded with debts incurred largely in buying or holding excess land that the relief which may be granted by the Government is relatively insignificant as regards relieving them from the other burdens of heavy taxes and backbreaking interest on the excess land. To put it in another way, even if the Government should grant indefinite extension of time for payment, some of these people must necessarily lose their lands because of the other charges which are falling due.

For this reason emphasis is placed on the fact that relief may be given to an applicant who shows that while he is at present unable to pay the past due charge, yet he has a reasonable expectation of making this payment at a later date. This showing is dependent largely upon the attitude of other creditors; and unless these creditors will make some concession by way of extensions of principal and reductions of interest, the help extended by the Government must necessarily be of little use. For this reason in all such cases the applicant should solicit the cooperation of his creditors, and the willingness of the creditors to make such extensions and reductions will be considered in determining the ability of the applicant to pay the water charges at a later date. Concessions made by a creditor must be in writing, signed and acknowledged by him. The need

of such provision is emphasized by letters from land-owners. For example, one recently received states:

You are right in stating that if those who have loaned money in the project will grant extensions and reductions in interest the settlers would soon be on the road to prosperity. But that is the very thing the creditors will not do.

At present I am paying 10 per cent compound interest on a \$3,000 loan.

It seems to me that since the Government has been so lenient with the settlers, the Federal farm-loan bank should be able to make reasonable loans on improved farms. This 10 and 12 per cent money was the very reason that many were unable to pay up their back water charges. It will also keep or retard payment in the future.

I feel that the Government has done all that we can ask for in line of extensions, but if we are to pay up in the future we must have more money and cheaper interest.

SHORT STORIES OF SUCCESSFUL SETTLERS.

By C. J. Blanchard, Statistician, Reclamation Service.

PERUSAL of the project press during the past month on the whole has contributed to a cheerful frame of mind. On most of the projects the coming of spring has kept the farmers so busy that hard-luck stories have had small space in the columns of the papers. On the other hand, we read of stockmen jubilant over rain-drenched ranges, the grain farmers are pleased with the prospect of a big crop of winter wheat, and the orchardists are contemplating with satisfaction the condition of the blossoming trees. Beet factories are gratified with their contracts with the growers, which assure increased acreage in this money crop for the project farmers. Corn, a crop much neglected, is being planted on thousands of acres, owing to the need of ensilage for the dairy stock.

Financial conditions show a decided improvement. Many of the banks have been reorganized. Federal loans are being made and organizations of bankers and farmers have been perfected and are buying high-bred dairy cows and swine to replace the scrub stock on the ranches. Cheese factories recently established are shipping their products to distant markets. The dairy cow, the pig, and the lowly hen is each having its day, and the amount of ready cash jingling in the jeans of the farmer is increasing. Local purchases are being paid for promptly, and this adds to the happiness of the merchant.

On several of the projects a healthy movement in settlement has begun. The new farmers are of an experienced type. One of the most hopeful signs is the awakened interest on the part of civic organizations in the matter of encouraging the subdivision and sale of excess and unused land holdings. On the Salt

River, Rio Grande, Boise, Milk River, and Minidoka projects definite plans have been worked out for an extensive publicity campaign financed by the chambers of commerce, boards of trade, and other organizations.

The rebound from the period of despondency and apprehension into one of hopefulness and confidence has been pronounced. The permanency of the change is predicated upon the increase in dairying and the initiation of better agricultural methods and cooperative marketing than have been in vogue in the past. Of course the granting of easier credits, reduction of taxes, and higher prices for many farm products are making for better conditions among the farmers.

The crisis to which the projects are now saying good-by has brought the farmers and business men in closer relations and in better understanding.

Secretary of Agriculture Wallace, who made a tour of a number of reclamation projects last month, received an ovation from the project farmers. At Las Cruces he addressed the Dona Ana County Farm Bureau at one of the most successful meetings ever held by the organization.

"We are trying to put business into government," Secretary Wallace declared, "and the Department of Agriculture is attempting to point the way and make it possible to establish a firmer business foundation for the agricultural industry. The agricultural and live-stock industries are the most important in the Nation. It is upon these that the Nation must live and prosper," he stated, in explaining why the Government was taking such an interest in their welfare.

As a real dirt farmer Secretary Wallace is making a decided hit on the projects and addressed a huge audience at every meeting held. His speeches are

always to the point, and he has entered into the problems of our farmers in a most sympathetic and helpful spirit. His personality is pleasing and his method of handling his subject is remindful of that of his distinguished father, the best beloved exponent of farming that Iowa ever knew.

During March and April the statistician delivered illustrated lectures as follows:

- March 1. Boys high school, Brooklyn, N. Y.
- March 2. American Institute Electrical Engineers, Schenectady, N. Y.
- March 7. Yale University, New Haven, Conn.
- March 12. Vermont Society, College Women's Club, Washington, D. C.
- March 13. Triangle Club, Washington, D. C.
- March 14. Manhattan Public School 157, New York City.
- March 15. Boys' high school, Brooklyn, N. Y.
- March 16. Foundry Methodist Episcopal Church, Washington, D. C.
- March 19, 20, 21. Rotary clubs of Butler, Grove City, and Ellwood City, Pa.
- March 28. Women's New Century Club, Wilmington, Del.
- April 10. Park View Association, Washington, D. C.
- April 11. Manhattan School 157, New York City.
- April 12. Eastern district school, Brooklyn, N. Y.
- April 12. Travel Club, Grand Central Palace, New York City.
- April 18, 19. Institute Science and Arts, Brooklyn, N. Y.
- April 20. Mount Vernon Church, Washington, D. C.
- April 24. Interior Department Auditorium.
- April 25. Manhattan Public School 157, New York City.
- April 26. Eastern district school, Brooklyn, N. Y.
- April 27. Lutheran Church, Washington, D. C.

Gathered From the Project Press.

Salt River project, Arizona.—With cotton and copper prices climbing to higher levels Arizona is passing from the pessimistic into the optimistic stage. Business shows a 100 per cent jump according to freight managers. With 50,000 range cattle consuming the valley's grain and forage crops ranchers are smiling again.

Visioning the permanence of this prosperity and anticipating a greater future expansion the water users' associations are getting ready to double the power supply at Roosevelt Dam, and later will further increase it by another dam and power plant in the river canyon below. The melancholy days are gone in Arizona's Garden of Allah.

Maricopa County stands twelfth in the United States in the value of her agricultural products and relative population and, area considered, is nearly first among the counties of the United States in paved highways. The county is finishing 308 miles of concrete paving, the funds for which were raised by two bond issues aggregating \$8,500,000. Every town in the valley now has its concrete highways radiating from the capital city of Phoenix.

The Southern Pacific Co. has completed a film of the Apache Trail from Phoenix to Globe, and arrangements are being made to show the wonders of this highway of romance to all the Nation. A beauti-

ful and commodious chalet on Roosevelt Lake is soon to be erected for the accommodation of the tourists.

Yuma project, Arizona.—Yuma is rejoicing in the good news that the Southern Pacific is soon to begin the construction of a new bridge across the Colorado and a change of stations to the eastern part of the city. The bridge will be a great cantilever with a single span of 500 feet. The railroad yards are to be doubled in size and improved icing facilities provided to meet the demands of the rapidly growing fruit and vegetable industry. The investment of the company is estimated at \$2,000,000. Now watch Yuma grow.

Yuma County has loaned to the State the sum of \$35,000 in order to expedite the completion of the transcontinental highway between Wellton and Stanwix, a link in the Phoenix to Yuma route.

Orland project, California.—Orland citizens were greatly disappointed when the congressional committee which toured the Imperial Valley failed to look over the "Project of No Regrets." Arrangements were made to extend to the lawmakers an elaborate reception before notification was received that the trip had to be abandoned. Orland folks are inclined to believe that the party fell under the spell of the Los Angeles boosters who entertained the Congressmen and their wives with a trip into Yosemite National Park. To soften the disappointment of the hospitable Orlanders assurance can be given that Congress does not require much information about Orland project, which is recognized in Washington as a 100 per cent success.

The United States gets two-thirds of its figs from Greece and Turkey, and the annual imports total 38,708,000 pounds. Orland has its eye on this market and is preparing to go after it. Plantings of fig trees this year will run into the thousands. The climate of this section is ideal for the production of the finest quality of figs, the popular variety being the Kadota.

The Harrold ranch is to become one of the big fruit propositions, as well as one of the prominent dairy ranches of the project, according to plans perfected by the manager of the property for the new owners, the Spreckles estate. A piece of 100 acres, ideally adapted to the purpose, will be prepared and planted to prunes, forming one of the largest acreages planted to that fruit in the Orland district.

The ranch is being improved, the buildings remodeled, and a string of top grade dairy cows collected to make it one of the leading dairy propositions in this section of the county.

Grand Valley project, Colorado.—Having greatly cheered the farmers of Uncompahgre Valley with the news of a \$100,000 expenditure to completely modernize the Delta factory, A. E. Carlton, president of the Holly Sugar Co., dropped in upon Grand Valley folks and spread a lot of sunshine there. He announced that a new power house costing \$20,000 would be erected at once and expressed confidence that the extension of the interurban line would be begun at an early date. This would bring joy to the homesteaders under the high line and should enlarge the area in beets on the project. Carlton has always been a booster for the Grand Valley and Uncompahgre projects, and his faith in them is attested by his large investments in both valleys.

The biggest land sale in Grand Valley for many years occurred recently when the famous Cross

orchard passed under the hammer of an auctioneer to 15 new owners. The assessed value of the ranch was \$51,590, and the sales totaled \$50,068. With the exception of one tract, every lot sold went to a resident of the valley. The prices ranged from \$115 to \$300 per acre.

The western slope is delighted to learn that expenditures amounting to \$9,500,000 are to be made by the Denver & Rio Grande Railway in betterments. With adequate transportation facilities this favored section of the West will make amazing progress.

The American Refrigerator Transit Co. announces its plans to construct a large ice-making plant with ample cold storage, costing \$400,000. The storage will have a capacity of 30,000 tons of ice. The company is endeavoring to increase the acreage planted in head lettuce in these valleys of high altitude where conditions are said to be ideal for growing this profitable crop.

The Currie Canning Co. is seeking to secure a 3,000-ton tomato crop from the valley farmers this year. This will require the planting of 450 acres.

One of the most pleasing signs of getting back to normal is afforded by the activities of the Grand Junction Chamber of Commerce in a publicity campaign to bring settlers to the valley. Secretary Wood, by his intelligent and conservative advertising, is getting results. The Grand Valley meets the requirements of the most particular kind of homeseeker, in climate, soil, diversity of crops, beautiful scenery, excellent roads, modern schools, and as fine a class of people as can be found anywhere. Its one great need is more farmers of a practical kind. Our best wishes for success to Secretary Wood and the enterprising members of the chamber of commerce.

Uncompahgre project, Colorado.—The Delta sugar factory will be completely overhauled this summer, according to a statement by A. E. Carlton, president of the company. Encouraged by the acreage contracted in beets for 1923 crop the company is preparing to expend \$100,000 in improvements. On April 1 the acreage subscribed was 11,000 out of the total 13,000 desired by the factory.

Montrose farmers are offered a cannery if they will contract to grow a sufficient quantity of string beans to warrant the investment.

The following statement from an agricultural expert is surely not flattering to the Uncompahgre Valley and may explain in part at least the numerous stories of financial distress and failure which reached Washington this winter:

"Food for thought when digested and assimilated often produces food of a more substantial character.

"Here is some of the mental food:

"Twenty-six per cent of the farms on the Uncompahgre had no family gardens in 1922.

"Thirty-six per cent had no milch cow.

"Seventy-two per cent of the farms had no brood sows.

"Twenty-six per cent of the farms had no poultry."

The Uncompahgre Valley is not essentially different from several other projects where the farmers have reported hard sledging.

Allen C. Nash, of Spring Creek mesa, has a small flock of pure-bred Hampshire sheep. On March 18 25 of his ewes had lambed, producing a total of 61 lambs, or an even 244 per cent. Four of the lambs were born dead and a few others were lost, but over

200 per cent were living. This is one of the few bunches of pure-bred sheep on the western slope and one of the best flocks in the State. The head of the herd is a son of a Chicago International champion, as well as a western national champion, a ram bred by the Kansas Agricultural College and purchased by Mr. Nash.

On March 17 Maurice Dawson, a county sheep-club champion of Montrose County in 1921 and again in 1922, bought one of Mr. Nash's registered ewes. The next day the ewe presented Maurice with three husky ewe lambs, which Maurice says is good enough for him.

Boise project, Idaho.—Cooperation among the farmers is the most important topic of discussion to-day. The marketing organizations of the valley are growing in strength and numbers every year and are receiving the cordial support of the bankers and merchants of the towns. Recognition has come that the cow, pig, and hen constitute the foundation upon which the agriculture of the valley can best be developed. Bankers are making easy loans to those who take up live stock and a nation-wide advertising campaign to boom the valley's advantages as a dairy region is under way. Cooperative creameries, cheese factories, egg, pig, and poultry marketing associations are flourishing.

The Canyon County Farm Bureau recently shipped a carload of young dairy stock from Nampa to the farm bureau of Blaine County. The shipment consisted of 30 heifer calves and 3 registered Holstein bulls and sold for more than \$1,000.

A new record for 3-year-old Jerseys has been set by a Boise Valley cow, according to a report from the American Jersey Cattle Club, received by F. R. Cammack, field dairyman for the university extension division.

The cow is Eminent's Dora B, and she produced 9,412 pounds of milk and 540.92 pounds of butter fat in one year, thus making her the Idaho senior 3-year-old champion.

This record displaces Fox's Triple Rosebud O'D, which held the record up to the present time with 531.38 pounds of fat.

Dora B has appeared in the 50-pound-per-month class three times, one of which was the past June, when she produced 53.30 pounds of butter fat.

The new Jersey record holder is owned by S. E. Gearhart, a Jersey breeder of the Boise Valley.

Duroc hog breeders of the Boise Valley associated themselves together at a recent meeting held in Caldwell for the formation of a breeders' association, known as the Boise Valley Duroc Breeders' Association, and including hog raisers in Gem, Payette, Ada, Canyon, Owyhee, and Washington Counties. There are 20 breeders in the association at the present time.

Jess B. Gowen, eloquent secretary of Caldwell's Kiwanis Club, who signs his letters "Yours for a million people in Idaho in 1930," panegyricizes the "Gem of the Mountains" thusly:

In central Idaho there is a section 200 miles square, almost an unknown world, wild as primeval chaos. This wonderful section is new, traversed by a new highway from Caldwell to Emmett through the new Black Canyon irrigation district; thence up the Payette River to Lowman; over the summit and through the Bear Valley, around Cape Horn, down the Salmon River past the majestic Sawtooth Mountains. Nestled at their feet are the Red Fish, Alturas, and Stanley Lakes, where one can rest and enjoy nature's wonders.

The trail then takes you down the Salmon through Clayton, where is located the once most productive silver mines in America; then over the summit to the head of

Lost River and down to Mackay and Copper City to Arco, where the river sinks, and near which are the most extensive lava beds known, in the center of which is the "Valley of the Moon."

The next part of the trip takes you along the north edge of the great Snake River Valley to the west entrance of the Yellowstone National Park, the beauties of which we are not able to describe. The trip through the park will take you out of the south gate into the Jackson Hole country, past Jackson Lake, the waters of which are stored and used for irrigation supply of the great ditches for 200 miles below.

The return trip brings you back through Ashton, St. Anthony, Idaho Falls, Pocatello, Twin Falls, and the Hagerman Valley, with its Thousand Springs. This beautiful valley is worth going miles to see. Thence on to Boise, the capital city, then to Caldwell, the college home city of the Gem State. The most wonderful two weeks' trip by auto in America. Let's tell the world about it.

Hop to it, Jess. Tell us some more about this wonderland.

Minidoka project, Idaho.—Prospects are fine for the securing of 55,000 tons of beets for the next season's run of the Paul sugar factory. That tonnage can come only through contracts covering 5,000 acres of beets. There are approximately 3,000 acres signed for. Representatives of the company are working hard to secure the full amount necessary for the desired tonnage.

The securing of 55,000 tons for the coming season means an additional bonus for the growers over and above that contained in the contract and based upon the price of sugar. Such a bonus is sure to go to at least 19 cents per ton, and might go a little higher.

It is a well-known fact that the man who raised beets last year came out ahead of the game, and with the offering of this bonus in addition to the regular contract it is expected that the 55,000 tons will be contracted and possibly more. The company is urging everyone to sign up early and get their crop planted as early as possible, as past years' experience has proven that the early beet gets away from the "white fly" and some of the other pests that damage the crop.

Bradley Moorehouse, farmer near Acequia and former county commissioner, is a great booster for the dairy industry for this project. He is now milking four cows which have been averaging him over \$60 per month, his January cream check being the highest—\$73.73. Recently he sold nine pigs, 6 months and 3 weeks old, weighing a total of 2,195 pounds, which had been raised on skim milk from the four cows, together with \$61.39 worth of grain. The price received was \$7.85 per hundred, or over \$172.

Mr. Moorehouse has 14 head of stock, mostly young stuff, 9 head coming fresh this summer and fall. "The dairy game will prove a paying proposition to anyone who will give it the proper attention," says the ex-commissioner.

That the dairying business in Rupert is fast becoming one of much importance is shown by the amount of money paid out by creamery and four cream stations during the month for cream. From March 1 to March 26, \$5,010.98 had been paid the farmers for cream by these concerns, an average of \$1,255 weekly, or \$6,265 for the full month. Adding approximately \$2,000 which the cheese factory will pay monthly for milk, it shows old bossy is bringing in pay checks well over \$8,000 monthly.

Dairy experts say that this community should be receiving at least \$50,000 monthly from the sale of milk, and give it as their opinion that this mark will be reached within the next year.

Another big shipment of cheese, 30,000 pounds, recently was shipped to Kraft Co., being the product of

the Rupert, Paul, Acequia, and Wendell factories. The shipment was made from Paul by H. F. Laabs.

Weekly shipments of cheese to the Kraft factory are now being made, and as the business is developed the plans call for carload shipments. Mr. Laabs expects to open several new factories during April and May. He has applications for factories from all parts of southern Idaho and expects to extend his operations as rapidly as possible until he has a large string of factories. Meetings were held this week in Declo, View, and Burley, and factories in each of these towns are possibilities for the near future.

With loans closed and money received to the total of \$34,400 for nine local farmers, the Federal Farm Loan Association of Rupert is functioning in good shape, says A. C. DeMary, secretary.

Besides the nine loans to the tune of \$34,400, four more, totaling \$21,700, are pending, and the money is expected shortly. Twelve new applications, for a total of \$38,200, approved by the local appraising committee, were also sent in March 23. When these appraisals are approved by the Federal Farm Loan Bureau the money will be available.

With the approval of the first loans recently came a charter for the local organization, and applications have been plentiful since that time, 46 having been made to date, the large majority wishing to take up mortgages now against their farms at 8 per cent with the Federal 5½ per cent money, with 34½ years to repay.

Thirty-three carloads of alfalfa meal were shipped principally to points in New York State and represent the output of Rupert's mill up to April 1. The price paid to farmers for loose alfalfa is \$8 per ton.

Deposits have continued heavy during the entire week since the reopening of the Rupert National Bank last Monday under its new officers—Crawford Moore, of Boise, president, and the directors of the First National Bank of Idaho, at Boise, as the directorate of the local institution. When the bank opened its doors for business the first day it was found that \$29,000 had been deposited during the six hours opened. During this period checks against the bank were less than \$8,000, with actual currency taken in over the desk of \$10,000 more than when the bank opened.

Directors of the institution, meeting in Boise the last week, named J. W. Murphy, former cashier, as cashier, with Miss Gladys Nelson assistant cashier, and they are now in charge.

Flathead (Indian) project, Montana.—Arrangements have been completed for the securing of a carload of Holstein cattle by residents of the Pablo district on the reservation through the Montana Mutual Dairy Loan Association of Missoula. Interested farmers met at the Reservoir Valley schoolhouse, a few miles west of Pablo, with J. A. Johnson, of Polson, director, and C. W. Fowler, manager of the association, and perfected the plans. There will be twenty-two 3-year-old heifers, two pure breds, and a pure-bred bull. They will be distributed to seven farmers.

Recently residents of the Valley View district, 10 miles southwest of Polson, contracted for a car of Guernseys, so that both Holsteins and Guernseys will be represented in the new additions to the reservation dairy herds.

Residents of Arlee are also interested in securing a car of Holsteins.

Two additional cars have been ordered to supply the demand for cows near Missoula. These will arrive some time shortly and will be held at the fair grounds

for distribution. These cattle are all being secured and imported by the association from Washington points.

Considerable interest has been taken in the seed-pea industry here, and as a result of the activity of members of the Polson Commercial Club more than 600 acres of seed peas will be planted in this vicinity this year. The Sloan Seed Co. was interested in the proposition here, and several meetings were held in the valley to interest farmers in growing seed peas.

President Johnson, of the Polson Security State Bank, discussing the duties of the community toward the new settlers, gave utterance recently to a number of common-sense thoughts which may profitably be read by other project people. He said:

Our community has reason to be congratulated on the desirable new farm residents who have come to make their homes among us this spring.

I do not recall any time within recent years when a more representative group has come to cast their lot with us, and I feel certain that their presence is going to be a distinct benefit to the older residents.

In behalf of these newcomers, I want to urge that all should unite in extending them a cordial welcome and making them realize that in coming to the Flathead they have come to a community where the interests of the individual are made the interests of all.

It is hardly necessary to state that the well-being and prosperity of each and every member of our community will contribute to the general prosperity, and in helping the new tenant or farm owner we will be in reality helping ourselves.

A practical way of making our new neighbors feel that we want to help them will be by going out of our way to be friendly. Don't wait for them to come to us. Go to them and let them know that if there is any way that we can assist them we want to know what it is. Let's make it plain to them by our attitude that cooperation is the rule here.

If the older residents will put themselves in the place of the new residents, they will quickly realize how such an offer of cooperation will be appreciated. If you were to move into a new community, you would not relish the idea that you were considered a stranger; and if you were made to feel that you were welcome, you would accept the invitation to take part in the community life and be willing to return every favor which was shown you.

That's the way we can make our community the best place to live in in the whole State. We want it to be just that; and if we can demonstrate in our welcome to our new neighbors that we want to be "all for one and one for all," we will go a long way in the right direction.

Huntley project, Montana.—Recently in the district court at Billings, says the Yellowstone, the local newspaper of the Huntley project, a ruling was handed down by Judge R. C. Strong which is of vital interest to farmers on the Huntley project. Farm units on this project whose titles are in the name of the United States are exempt from taxation, according to Judge Strong's ruling, and a permanent injunction against various officers of Yellowstone County, ordering them to remove from the tax rolls of the county farm lands coming under the ruling, was granted.

The injunction ends a legal battle commenced over a year ago, when the plaintiffs protested against the county officials showing their holdings on the tax list.

Milk River project, Montana.—Progress is reported in the corn campaign to get 10,000 acres of corn grown in Blaine County this season. Fifty farmers have reported thus far in a questionnaire sent out from the county agent's office averaging 20 acres each to be planted this spring.

A total of 650 Phillips County farmers representing almost half of the farming population of the county visited the farm demonstration train in Phillips County which stopped at the towns of Dodson, Malta, and Saco last week, and farmers in attendance at the meetings were unanimous in the statement that the train brought with it the most valuable

agricultural information ever offered to farmers in this territory.

North Platte project, Nebraska-Wyoming.—Gene Bellingar's first annual hog sale last month, at which 32 head of pure-bred Duroc Jersey sows and gilts were sold, topped all the thoroughbred-hog sales held in the valley this year. The best tried sow sold for \$65 and the best gilt for \$50, which shows, if you raise hogs, it pays to raise the best.

Quite a number of these hogs will stay in this vicinity, although there were buyers from Bridgeport to Guernsey. Jay Canfield was the largest buyer, purchasing five of the best hogs. The Bay State Ranch of Mitchell came second by adding four hogs of the excellent offering to their list.

Newlands project, Nevada.—That a vegetable canning plant and a milk condensary are in prospect for Fallon is indicated by a letter from the Reno agency of the Northwestern Life Insurance Co. to the local chamber of commerce tentatively preparing to help finance a \$100,000 project providing production of raw material and other conditions are complied with. Propositions from other milk-canning concerns have come to the attention of L. E. Cline, Federal agriculturist stationed here.

The Northwestern Co.'s proposal was to support a bond issue with half of the \$100,000 to be raised, providing \$50,000 were subscribed locally. The plant would can vegetables and milk, and substantial production of both would be required.

Fallon business men and farmers have promised sufficient money to install a small canning plant for the purpose of testing the possibilities of canning vegetables grown on Newlands project, according to A. J. Reed, county agent. The principal object of installing such a plant would be to prove the extent to which a large canning factory might be profitable here, it was indicated. This would lead to some well known canning concern coming to Fallon and erecting a plant, or to the financing of such an enterprise by local capital.

The proposed test plant could be made to produce 800 to 1,000 cans daily and could be placed in a 12 by 16 foot room. It could be made to put up canned stuff economically and its output could be sold to cover operating costs and even a small profit.

Fernley, looking out on a most pleasing prospect of prosperous farmsteads, is having a building boom. Stock yards are being remodeled to care for increasing business; the Standard Oil Co. is erecting a large station; a new meat market and a cold-storage plant are going up. Many new dwellings are in process of construction and business in all lines is excellent.

Fernley farmers are rapidly going in for intensified agriculture. Fernley growers will have the largest proportion of acres planted to cantaloupes of any farming section in the State. Beans, a practically new crop in this part of the State, will receive considerable attention this year. The dairy business is increasing rapidly.

The pupils of the Oats Park School have begun the work of making beautiful the school surroundings by planting California privet about the building and shade trees in various parts of the grounds. Shrubs and trees were contributed by public-spirited citizens.

Farmers on the project are determined to have good roads. When the county and State funds are not forthcoming they go out and build the roads them-

selves. They have furnished thousands of dollars in labor and are gradually linking up the unfinished ends of the county system by working together. The county has built 10 miles of graveled highways during the past year and graded 30 miles. These roads radiate from Fallon to the farming country. The cost has ranged from \$1,500 to \$3,000 per mile.

Rio Grande project, New Mexico-Texas.—An honor coveted by all cattle breeders has been awarded to the pure-bred Holstein herd belonging to Latta & Redd in the upper valley. They have the first herd in the Southwest to receive a certificate as Federal accredited tuberculosis free.

The herd has been under the testing and supervision of Department of Agriculture and State experts for three years.

Latta & Redd established their herd of registered Holsteins near Canutillo four years ago and have made many fine records for milk production and sale of breeding stock. Several of the cows have advanced registry records. One cow, Zozo Clothilde Holland, 157482, produced just a few pounds under 20,000 pounds of milk in one year, an average of 7 gallons daily.

Another cow, Palo Verde Colantha Aaggie, 450524, as a senior yearling, made a record of 14,339 pounds of milk in one year's official test.

A study of the stable milk sheets of this herd shows that for a time every cow in the herd was producing above 60 pounds of milk daily.

Pure-bred Holsteins have been sold from this herd to many of the dairies around El Paso.

We most emphatically indorse the plan proposed to organize a branch of the joint State farm-loan bank at Las Cruces and hope that it will be accomplished without delay. Our suggestion, however, would be to organize the bank to serve both upper and lower sections of the valley.

Umatilla project, Oregon.—About a year ago, Colonel McNaught, near Hermiston, decided that if his neighbor, George Strohm, could make a success of the hog feeding and breeding game he might learn a few of the tricks himself, and that he has succeeded in his ambition is the conclusion justified by the declaration of Bert Whitman, of the Pendleton Packing & Provision Co., that two carloads of hogs from the McNaught feed yards recently received by the local concern are about as fine as have ever been slaughtered here.

Colonel McNaught purchased about 50 head of gilts and sows from Strohm last season. With this brood stock he produced something like 350 head of fat hogs, the first carload of which came to the Pendleton market more than a week since and the second lot yesterday.

Colonel McNaught had out quite an acreage of corn on his ranch near Hermiston last year, and he used corn and barley to top out his red beauties. He will have another carload on the market here within a short time, and he now has a big crop of pigs that will be ready for market next fall. At the present rate the colonel will be marketing about six carloads of fat hogs every year.

"We are securing a nice lot of classy hogs from the Hermiston district now," Mr. Whitman declares. "The prices established by the Portland market are used as a basis for our dealings. It is less trouble for the Hermiston breeder to ship here than to Portland; he gets the same net price; and we get some good hogs; a good deal for all of us."

Colonel McNaught's hogs have weighed out slightly under 200 pounds.

Belle Fourche project, South Dakota.—A movement is on foot to ship into the project a few carloads of high-class dairy stock, selected from among the best producing herds of Wisconsin. At present a full carload of choice registered Holsteins is assured.

Under the plan as proposed an expert buyer will make the trip to Wisconsin, without added expense on the part of the farmers, the animals to be selected on their records of performance as well as individual merit. The present price of performance in registered dairy cows and bulls is a third less than the prices prevailing last fall. So now is the time to buy.

By buying direct it is believed that excellent registered Holstein heifers from 2 to 3 years old, due to freshen in the early fall, can be purchased for from \$100 to \$150, and grade Holstein cows from \$90 to \$100.

Strawberry Valley project, Utah.—At a meeting of about 150 farmers of this district held on March 29, it was decided unanimously to accept the latest proposition of the Utah-Idaho Sugar Co., and to raise as large an acreage of sugar beets this summer as possible.

The proposition now made by the sugar company is to pay for sugar beets raised this year on the 48-52 basis, providing 45,000 tons of beets are raised in Spanish Fork district. The minimum price of \$5.50 per ton will be paid for the beets, after which additional payments will be made according to the price received for the sugar sold.

The tonnage now asked for by the sugar company really is no guaranty at all. Spanish Fork district produced last year over 42,000 tons, and last year was the poorest beet year we have had in this district for a long time.

Following the discussion of the sugar-beet situation, Pratt P. Thomas, cashier of the Commercial Bank, stated that his institution was ready to back any farmer financially who desired to purchase pure-bred dairy cows. The proposition was so popular that about a dozen farmers immediately accepted, and as a result it is more than likely that a carload of pure-bred dairy stock will be brought to Spanish Fork this spring.

DIRECTOR DAVIS ON WESTERN TRIP.

Chief Engineer Weymouth, Acting Director.

Director Davis left Washington on April 14 for an extended trip, which will include a number of the projects. Before reaching the West he expects to visit Muscle Shoals and New Orleans. In the West he expects to accompany Hon. D. W. Davis, Special Assistant Secretary of the Interior. He will also visit the Columbia Basin project and, in connection with that part of his trip at least, will be joined by Hon. F. M. Goodwin, Assistant Secretary of the Interior.

During the two months' absence of the director the Washington office will be in charge of Chief Engineer Weymouth as acting director.

Alfalfa succeeds best in a dry climate where water is available for irrigation.

AGRICULTURAL POLICY FOR MONTROSE COUNTY, COLO., AND THE UNCOMPAHGRE PROJECT.

By Ben H. King, County Extension Agent.

[The following extracts are from an article by Mr. King printed in a recent issue of the Montrose (Colo.) Daily Press. Many of Mr. King's remarks are so applicable to conditions and needed methods on other projects that we are reprinting these extracts for the benefit of our readers in general.—*Editor.*]

THE agricultural needs of this county are many and varied, and we will attempt to list only a few of the most important.

SOIL.

We must have more judicious use of irrigation water. Some of our land is already beyond recovery unless drained, and drainage is expensive. Conservation of moisture is better than constantly running water. Our sick soils need a change of diet as well as taking away the "water cure." We need greater variety in our crop rotations to keep out diseases. We need to put more vegetable matter back into the soil, as this is both a physical and chemical necessity.

TYPES OF FARMING.

We must come to a more diversified system of farming. We must grow more feed crops, market them through live stock, and sell the crop in concentrated form, such as butter fat, pork, beef, mutton, and poultry products, with the residue put back onto the land to make for a permanent and profitable agriculture. Sugar beets, aside from being a profitable cash crop when grown under the right conditions, are a good addition to the rotation system, benefiting the soil structure and removing some of the alkali. By growing beets likewise we make available to this county the valuable by-products of the factory for live-stock feeding.

An acre of permanent pasture can be made one of the most profitable acres on the farm.

The number of live stock on our Montrose County farms is deplorably low. We should build this up until there is an average of a good brood sow, at least, one good dairy cow, and a profitable poultry flock on every farm. In addition to building up the number of our live stock we must pay attention to the quality. The largest improvement in this direction will come from banishing in all lines the inferior-grade sire.

STABILIZE AND STANDARDIZE.

We must stabilize and standardize our production. By this we mean for each farm to adopt a suitable system of rotation of crops that will maintain a well-balanced acreage of each every year. Keep about the same amount of live stock, etc. Don't

jump in and out. You are more apt than not to be just a jump behind all the time. By standardizing we mean to give a little thought to varieties of crops and breeds of live stock that are best suited to our conditions and markets. Instead of producing such a variety of similar products, let us specialize on a few of the best. Petaluma, Calif., is known all over the United States as a White Leghorn center, Wisconsin is noted for her Holstein cattle, and Boulder County, Colo., is recognized in the State as a source of Minnesota No. 13 corn. In what things can Montrose County become identified as a leader? By standardization, exchange of seed and breeding stock is rendered easier within the county, and bulk production is secured which attracts a market.

SEED PRODUCTION.

Our conditions are admirably suited to certain kinds of seed production. This can be made a profitable crop by individuals adapted to it. Good seed is usually a high-priced commodity, one that will stand our high freight rate and for which there is a growing demand.

QUALITY.

In all our production efforts we must strive for the best of quality. This is important in several ways. In times of overproduction only the very best quality can find a market, the inferior product going begging. In times of normal or underproduction, the better quality will always bring a premium. Quality is an advertisement that brings and holds business. It costs very little if any more to produce quality products and the returns are always better and more satisfying.

BUSINESS BASIS.

We must get our farming operations on a business basis. We must know the cost of production accurately. That is the only way to determine whether a certain operation is making or losing money. We may make or lose money on the whole farm in a certain year, but only by a system of proper accounting can the particular leaks be discovered and stopped. Therefore every farm should keep a good, accurate record of the business. It is a wonderful eye-opener and few operations on the farm return more profit for the time involved.

TRANSPORTATION.

We should use every possible endeavor to improve our transportation facilities, but at the same time

we think we should adapt our requirements to the conditions as they are. At the very best we can never hope for the freight rate or service of the non-mountainous districts. Therefore it would be only wise to attempt to reduce our freight bill by concentrating our products to be shipped out to the smallest bulk and highest priced commodity possible. We must become more self-supporting at home and do away with shipping in such large quantities of canned goods, meat, eggs, seeds, etc. In other words, ship out only those commodities that can stand the freight rate and import nothing we can raise at home. This is just a case of Mohammed going to the mountain.

ORGANIZATION.

What organizations should the farmers have to assist them in their problems of production and marketing?

Wherever more efficient marketing can be rendered by cooperative commodity marketing associations, provided there is a necessity for such organization and the farmers can and will accept the responsibility of the formation and perform these services better

or more economically than the existing system, such organizations should be encouraged. Our present system has been built up over a long period of years and can not be easily supplanted.

Discouragement should not come with the first apparent failure. The farmer should not be dissuaded in his attempts to market his own products, but with full realization of the difficulties involved should be given every encouragement and assistance possible.

Other organizations we should have in time are ones to promote the interest and improvement in our various breeds of live stock, and perhaps a registered seed producers' association. Last, but by no means least, we must keep functioning to the fullest extent our recently formed county agricultural advisory council. This council cooperates with the extension service of the agricultural college and the United States Department of Agriculture in planning county-wide development work with the men on the farm, the women in the home, and with the children through the club work. This organization can plan for the carrying out of the program of work of the county extension office, as based on this agricultural policy, in the proper manner and time as seems best.

PRACTICAL SUGGESTIONS FOR POULTRY FARMERS.

By H. O. Numbers, Secretary Pennsylvania Poultry Association, Loretto, Pa.

WHAT are we doing individually to promote the poultry industry? If every poultry farmer would apply this question to his own condition and not pass it over without due thought and deliberation, we would soon be an exporter of eggs and not an importer. "What can I do personally that will so revolutionize this gigantic problem?" is the usual retort. Well, let's get right down to bedrock. First, in your community you are one of a group who raise poultry. If you are enthusiastic yourself, you can radiate the same business sentiment among your neighbors. It does not require psychology to interest a man in a subject that he is already familiar with and which holds an appealing influence over his nature. You will have no trouble in talking the matter over among poultry farmers. "What is the subject, or what shall we talk about?" Organization. That's the answer. I will not tire you by forever talking organization, but that is the only solution of our perplexing problem.

Will you permit an illustration of poultry progress as practiced in my own State? A district group has organized. The area covers not over 4 miles of a radius. There is a president and a secretary-treasurer. If the president requires assistance, he appoints committees—one man on each committee. Too many officers are a detriment to a successful end. Each one

depends on the other. Each district has a representation on the directorate of the county association. Of course each member of the district is a member of the State organization. In our State we have egg farmers, breeding establishments, day-old chick hatcheries, and fanciers who breed for show purposes. We must take care of all the different lines of industry. Through the secretary we have secured markets in the large cities for the egg farmers at prices more than 20 per cent in advance of local quotations. We have given free advertisement in recognized publication for the other lines. We know who has stock for sale, and we also have a line on prospective customers and refer them to our members, who report encouraging results in sales. The district club is in touch with State headquarters. Prospective customers are taken care of by the districts; and if they can not buy to advantage, the county association assembles the requirements of several groups, and satisfactory prices are made for all requisitions. Each district must first standardize its product to conform to State requirements. This is essential to securing a premium on the prices paid for produce.

The secretary of the State association is in receipt of letters and requests from dealers, offering fancy prices for "graded produce." And right here let me say that too many farmers sell poultry for table pur-

poses that should never go further than the incinerator. I have seen, in my own State, farmers go out in their flocks and pick out birds that had disease and slaughter them for sale. A bird that has an attack of roup, diarrhoea, tuberculosis, limberneck, or any other disease is unfit for eating. This may seem startling to the readers. But it's the truth, nevertheless. We are striving through our organizations to put a stop to this criminal practice. A hen that is in a molt is not a fit carcass to eat. When you have poultry to sell, first condition it. Place it on a fattening process for at least 10 days. Sell only what you would eat yourself. Think of the lives you endanger

by the ruthless practice of selling diseased birds. If our beef cattle and hogs are required to pass an inspection before being sold to the public, why not poultry? We are now working out a plan to combat this problem.

But let us return to your individual responsibility in securing an uplift campaign. Get after your county agent or State college extension force. Demand an organization. They will cooperate. We tackled the job in Pennsylvania. We succeeded. It will take time, but the longer you delay the longer you will be out of the profits you deserve, and so much longer the public will be deprived of high-quality poultry products.

PROJECT WOMEN AND THEIR INTERESTS.

By Mrs. Louella Littlepage.

Spring Fever.

THAT "tired feeling" used to be the prevailing symptom, but in these days of balanced rations and uncanny knowledge of such unseen forces as vitamins and calories, these days when to admit that spring finds one fagged is to acknowledge ignorance, that "tired feeling" is not talked about.

But there does come a time of year in every woman's life when she wants to throw away the flour can or disguise the sugar box or change the location of the furniture, the color of the wall paper, or dump her many small belongings in the trash heap. If she is a housekeeper, it usually strikes her in the kitchen first, and she knows that spring has come and the fever is in her veins.

When the spell comes on don't let it alarm you; the remedy lies at your door. Seize a paint brush and see if a jaunty coat of paint on something doesn't allay the severest symptom.

One farm woman courageously painted her entire kitchen—light-gray walls and a darker gray for the wood work and floor. Flour sacks bleached under the apple blossoms, the hem put in with blue feather stitching, made dainty curtains for the windows, and a bedroom rocker painted gray like the other chairs made the work of preparing certain vegetables a delightful pastime. In the fall she plans putting her turkey money into a gray and blue linoleum for her kitchen floor.

Perhaps it is the food containers that need replacing or repainting. These humble necessities are unreasonably expensive just now, and not long ago I heard the story of a resourceful woman who simply could not keep her spirits up in the presence of a battered bread box and a flour can which sagged wearily and threatened certain disaster. On her Saturday trip to town she noticed the grocer care-

lessly throwing a large can under the counter. She looked around the store with suddenly hopeful and curious eyes. A tall tin can with a handful of hard candies in the bottom was just before her, and a short, fat peanut-butter can was standing at her elbow. Upon inquiry she learned that these receptacles were usually carted to the dump heap as soon as emptied.

The next day that woman was using some black left-over auto enamel to paint an interesting assortment of jars and cans. Later they were given a coat of good spar varnish, and in a few days her kitchen had a new and delightfully saucy note in the elegance of this row of new containers.

First Woman to be State Game Warden.

New Mexico boasts that they have the world's first woman State game warden, although another State has women deputies.

"Don't you think some one should be in the position who is sympathetic with the hunter?" was asked the governor. "No," he replied, "I think the hunters have had too much sympathy; that's why so many of them have killed more than the bag limit and shot game out of season. Conservation of game is what New Mexico wants."

Mrs. Melaven was born in Missouri, and "every word, every movement, every snap of the snappy eye," a reporter says, indicates that she has to be shown. "I love the New Mexico quail and trout," said Mrs. Melaven, "and I am going to give them protection and do what I can to increase their number. There is no reason why the streams of New Mexico should not afford as good fishing as the trout streams of Colorado."

No; the new game warden is not trying to get women as wardens, but because an applicant is a woman will not be against her. Good luck to her.

New Swimming Pool.

Spanish Fork, on the Strawberry Valley project, Utah, has voted unanimously for a swimming pool and playground, and the city council, women's clubs, civic clubs, and other organizations are cooperating to see that a pool centrally located and large enough to meet the demands of a growing city is constructed. A landscape gardener is looking over the available sites in order to be able to point out the advantages of each from his standpoint, and engineers are investigating the drainage and other facilities from a technical view. A conservative estimate of cost outside of labor, which will be contributed by interested citizens, is \$500. Definite plans for raising the money have not been decided upon, but that is a mere detail now that the citizens have determined to have this improvement.

Electricity in Homes Subject of Study.

How to make the percolator perk, the vacuum cleaner clean, and the washing machine wash was demonstrated at a home makers' class at one of El Paso's schools recently when electrical appliances were studied in a course on household equipment. Home economics teachers from all the city schools watched the demonstration. Girls who made 100 in the monthly home economics class served coffee and cakes, and later the guests were treated to an exhibit of sewing which included many interesting and attractive articles.

Prospective brides and housewives who desire to become adepts in the culinary art and domestic science may do so by registering in this class.

Prizes For Recipes.

In order to stimulate the greater use and better preparation of vegetables in Nevada homes, the University of Nevada announces a vegetable cookery contest which will continue to September 1.

A prize of \$8 is offered for the best recipe for preparing each of the following vegetables: Spinach, other greens, cabbage, asparagus, celery, tomatoes, carrots, rutabagas, turnips, parsnips, beets, and onions. The following basis of award will be used in judging this contest: Food value, 40 per cent; palatability, 30 per cent; ease of preparation, 20 per cent; attractive appearance, 10 per cent. Contestants must be residents of Nevada.

This is an effort to solve a real problem by securing the combined efforts of practical women.

"Giving Sunnyside a Charm."

Under the above caption a local Washington paper printed a little editorial, which is typical of project spirit, and so well worded that the citizens of every town in the United States should read it.

People travel across the stormy Atlantic and spend no end of money on European tours. Why? Largely because the European cities are reputed to have a certain romantic and imaginative "charm."

Yet this so-called charm often lies in some simple feature that can be developed anywhere. Many American cities and towns have such features now. A recent writer in *The American City*, for instance, thinks that the charm of Paris lies largely in the beautiful trees with which that famous city is profusely planted, and which are preserved with the greatest care, even in the business sections.

Sunnyside or any American city, big or little, can in due time secure just that feature of charm and attractiveness by studying tree culture for its streets. If its people have been negligent in this respect they can plant quick-growing varieties that will transform their town in a few years. Too frequently Yakima Valley folks take down a noble tree, because it blocks a sidewalk a little or for other trifling reasons. But by cherishing their trees, planting those fitted to the soil and climate, preserving them from pests, they can give their home town rare beauty. One does not have to cross the wide seas to find charm. It can be developed right in Sunnyside.

Graduating Dresses.

Lewis and Clark school girls, Spokane, Wash., graduating in June, must not pay more than \$15 for their dresses for commencement exercises. The girls of the class have adopted a resolution establishing compulsory rules to be followed in choosing graduating wardrobes. The rules are as follows:

The cost must not exceed \$15.

The material must be cotton and either voile, net, organdie, or embroidery.

The dresses must have sleeves, either long or short. No gloves.

The length is to be guided by present styles, which call for a good length.

Hosiery must be white.

Any style of shoes may be worn.

The girls also decided that any dress suitable for church wear would be appropriate for wearing to the baccalaureate exercises.

National Garden Week.

National Garden Week, sponsored by the clubwomen of America and indorsed by President Harding, seems to be receiving the cooperation of entire communities on practically every project. Plant-exchange days, instruction in planting and cultivation, prizes for plans and for results during the season, are only part of the program which promises to unite entire communities through a general desire and movement to improve appearances of home and public places.

The rose festivals and flower carnivals of certain cities of the West have made them literally world famous. That town or community which does not take pride in the appearance of its homes these days is a hopeless back number.

Pumpkins as Beautifiers.

Speaking of beautifiers, we do not ordinarily think of the humble pumpkin in that connection, although we remark upon the beauty of a scene when in autumn great, golden pumpkins peep at us from the rows of drying maize, but there are other places where their beauty can be made to serve a worthy purpose.

Bare spots in field, garden, or yard would be much more attractive looking if covered with the big green leaves of a pumpkin vine. A back fence or old chip or brush pile make good places to run the friendly vine.

One of the prettiest sights ever seen was an outdoor cellar completely covered with pumpkin vines. Early in the summer it was a solid mass of rich green leaves and big trumpet-shaped yellow flowers, and later the spot was just as pretty garbed in its autumn dress of yellowing leaves and golden fruit. Thirty-six pumpkins were harvested from the vines that grew on and around this little cave.

The pumpkin vine is not hard to grow. It does not demand an especially rich soil and thrives with very little care. Seeds are easy to obtain and the matured pumpkins are delicious food. Don't you wonder why they are not more often planted? Try some this year in some tumbled-down spot which is a trial to you and the results will surprise you.

Can Your County Beat This?

Every rural school in Maricopa County, Ariz., has a hot lunch for the school children every day, through the activities of the women's home demonstration clubs, organized as a result of extension work.

Why Your Boy or Girl Should Belong to a Club.

The Banker-Farmer has presented six reasons why the work clubs for the younger generation should be boosted.

1. A boy or girl adopting a modern practice has from 40 to 50 years to use it as against 20 years for the average man who adopts a new practice.

2. Boys and girls are more easily influenced to take up the new methods advocated by the agricultural colleges than are adults.

3. More boys and girls can be reached than can adults because demands are not quite so great upon their time and they can be readily formed into clubs.

4. By reaching the boys and girls, the adults are reached at the same time, so that the results obtained in changing the agricultural practices of communities are very great.

5. A dollar expended for boys and girls work will produce two or three times the results for the same amount expended in adult work for the reasons given above.

6. Boys and girls club work reaches the masses (there were 500,000 in the clubs in 1921, and about 600,000 last year) and is a feeder for the agricultural high schools and colleges.

Wild Flowers.

It is not too late to take a wild-flower excursion. A wild-flower plot in the corner of your garden will require little attention after planting and will be an everlasting joy. We have in mind such a corner where blue and white violets and Johnny-jump-ups, Dutchman's breeches, harebells, wild geraniums, black-eyed Susans and ferns formed a perpetual beauty spot.

Women Promise to Buy Home Products.

With 6,000 women and housewives of El Paso enlisted to demand "Made in El Paso" products, the growth and prosperity of that city has received a great impetus.

The movement was started by the chamber of commerce, and the president of the federation of women's clubs said if the chamber of commerce would furnish a list of home products she would see that each separate organization appointed committees to insist that merchants handle these products.

One of the members of the chamber of commerce stated that if the 225 carloads of flour which were shipped in last year were manufactured and sold in El Paso it would leave \$250,000 there to pay salaries and aid in other lines of business. "Better support of home industries," said Mr. Allen, "means more factories, more factories mean more business, more money, and prosperity. We can also attract more outside capital and industries if it is known that we support our home industries."

Plant a Little Pop Corn.

If there are children in the family, be sure to plant a little pop corn this spring, a couple of rows along the side of the regular corn field or a couple of dozen hills in the garden. It will give a delightful variety of food that will be pleasing to the children, especially if used for Sunday night supper, or an occasional breakfast, or as a change in the school lunch.

Pop corn seems to be a peculiarly American product, according to Government food specialists. Though it is most often eaten between meals and as a sort of food accessory, it has a food value similar to that of the same weight of corn prepared in other ways. It makes an excellent breakfast cereal served with milk or cream, and it is hard to imagine a better supper for a winter Sunday at home than corn popped over the open fire and served hot with melted butter or with milk and a little salt, and perhaps with apples or other fruit as a finish.

Pop-corn balls make a delightful surprise in a school lunch pail, and the sirup which holds them together is made just as you would make taffy, only do not cook quite as hard. The same sirup with chocolate added may be used to coat the corn with a chocolate coating and is liked as a change.

How to Make the Sewing Screen.

One of the most convenient devices for keeping all sewing equipment in place is a sewing screen. This folding screen is light in weight, requires little space, and can be easily carried from room to room or to the porch or lawn or wherever one desires to sit while sewing.



Folding sewing screen.

The one illustrated was designed by the Agricultural Department. It consists of two panels (28 inches high and 13½ inches wide made of 1 by 2 inch strips) hinged together and each panel covered with burlap. A pocket is fastened to the bottom of each panel on the inside, and hooks are placed on the bottom of the cross pieces to hold the necessary equipment. Pegs or nails driven into the top of one of the cross pieces will hold the spools. A drop shelf attached to the upper part of one panel makes a good worktable.

The material required consists of—

- Ten feet lumber 1 by 2 inches.
- Six 1½-inch (butt) hinges with screws to be used in joining the panels and fastening the drop shelf to the cross pieces.
- One handle with screws for top of screen.
- One hook and eye to fasten panels when they are closed and folded.
- Two yards burlap, denim, or canvas, 18 inches wide.
- One dozen brass cup hooks.
- One yard of cretonne for pockets.
- One yard of ¼ inch elastic for top of pockets.
- Four dozen upholstering tacks for tacking burlap.
- Sand paper and stain.

Oftentimes very good dyes and wood stains can be made from nut hulls, roots, berries, or the bark of trees. The cloth, not being the same texture, will take the dye in a little different shade than the woodwork.

Wood stain.—To make a good brown stain for the frame cover 3 pints of bruised green walnut shells with 3 pints of water and allow to stand for 12 hours. Strain through double cheesecloth and add 1 ounce of permanganate of potash. This stain may be made in larger quantities for floor stain. It gives a rich brown floor finish. If a semiwaxy appearance is desired, 1 quart of paraffin oil can be added. A similar stain can be purchased on the market at a reasonable price.

Sewing equipment.—While supplies may be varied to suit the work in hand, the following will be found convenient:

- Needles of good make and assorted sizes.
- Thread, also of good make and assorted sizes.
- Substantial thimble of any material except brass.
- A pair of sharp shears with 5-inch blades for cutting cloth.
- A pair of small, sharp scissors with good points for cutting thread, removing bastings, etc.
- An abundance of medium-length sharp-pointed pins. Fine pins are much easier to use than coarse ones.
- A small pin cushion.
- A tape measure.
- A few pieces of cardboard to use as gauges.
- A pencil.
- An emery bag for sharpening and smoothing needles.

Voluntary Cooperators Needed for Bird Counts.

Bird censuses furnish information as to the exact number of pairs of breeding birds actually nesting within the boundaries of selected tracts of land and throw light on many problems concerning the distribution of bird life. It is very desirable that this work be continued on an increased scale, and the co-operation of volunteer observers interested in bird life is asked by the United States Department of Agriculture.

This is a fine work for the schools to take up, and Saturday excursions could be made very instructive, with a little plant study, a little forest lore perhaps, and lessons in bird life.

Information is needed regarding the numerical distribution of the birds breeding in different sections of the country and on different types of land, the relative numbers of different species, and the fluctuations that take place in bird life.

The department must depend wholly on the unpaid assistance of volunteer observers. The help received in the past has been greatly appreciated, and it is hoped that it may be extended. Detailed instructions for taking the censuses, with necessary blanks for reports, will be furnished upon request by the Biological Survey, Washington, D. C.

THE CARLSBAD PROJECT, NEW MEXICO.¹

By Hon. D. W. Davis, Special Assistant Secretary of the Interior.

I CONGRATULATE the people of this valley on the substantial progress made since 1908, when the project was opened. Your success was not accomplished without severe struggles, and your achievements, therefore, are all the more commendable. Your adversities and difficulties have developed resourcefulness and have strengthened your purpose to make this New Mexico's garden. Apparently you have put agriculture on a sound and permanent footing. Each year shows great progress in production and in better methods of marketing the crops adapted to this region.

The net construction cost of the project up to October, 1923, was about \$1,400,000, and of this amount you have returned to the fund 24 per cent. As a result largely of the use you have made of the investment of the reclamation fund in your project the increase in land values has been more than \$3,000,000, and the gross value of the crops produced in the 10-year period closing 1921 totals \$7,000,000.

The Carlsbad project furnishes a notable example of the soundness of reclamation as a national policy and the strongest kind of an argument for its expansion and continuance.

Particularly am I pleased to find that the pledges made to the Government for repayment of its investment are being carried out in good faith by the farmers. Notwithstanding the great deflation in the prices of all agricultural products, only three farmers on this project asked for deferment of charges. Keeping the faith is an evidence of civic pride as well as of integrity and certainly must win the consideration of Congress for your requests for feasible extensions of the project when funds are available.

I am especially gratified to note the cordial relations existing between the farmers and the Interior Department. The mutuality of interest which I find here is conducive to the frank and friendly understanding of all matters relating to the project which Secretary Work is seeking to promote on all the projects. The management of project affairs is only temporarily in the hands of the department, and the time is not far off when the operation and supervision of this valuable public utility will be intrusted to you. It is the policy of the department to encourage the farmers to assume these functions at as early a date as possible, in order that the forces of the Government may be devoted to taking up of important con-

struction work to make more lands available for home makers.

Cooperation at this time therefore not only encourages greater efforts toward efficiency in management but develops initiative, individuality, and ability among the settlers which will be valuable when its affairs are placed in their own hands.

That efficiency has been improved is shown by comparing various cost items covering the past four years, among which may be mentioned the following: General expense cost reduced 50 per cent since 1919; operation and maintenance from \$2.86 per acre in 1919 to \$2.36 in 1922, and a further reduction in 1923. Among the evidences of real progress I might recite the increase in irrigated acreage from 20,363 in 1919 to 24,076 in 1922, and the increase of farm population from 634 in 1919 to 1,435 in 1921.

Economists are agreed that agriculture is on the upturn. A study of the world's markets indicates high levels for cotton, a crop which means much to the farmers here. I am looking forward to more stable conditions for the stockman and the general farmer.

The affairs of the Department of the Interior during the entire administration of President Harding have been directed by western men familiar with the needs of western people and in full accord with their ideals and purposes. Your new Secretary has devoted the best years of his life to western development, and his knowledge of our desert regions is wide, especially in matters relating to irrigation. It was his wish that I should acquaint myself personally with the economic conditions on the projects which he by reason of the pressure of official duties may not visit himself this summer, in order that I might bring before him a report of conditions in which you are most concerned.

On each of the projects the human problems overshadow those of engineering, and knowledge of these problems is obtained only through personal contact and investigation on the ground. I am here to assure you that all such matters will receive the sympathetic and helpful consideration of the Secretary.

Much money may be saved by the farmer in intelligent seed purchases which in turn may lead, through the buying and planting of better seed, to larger returns from increased production on a smaller acreage.

¹ Extracts from speech at Carlsbad, N. Mex., Apr. 17, 1923

RENDER A FULL MEASURE OF SERVICE.

Secretary Work Makes Pertinent Suggestions Concerning Correspondence.

MARCH 27, 1923.

To all Officers and Employees of the Interior Department:

UNDERLYING every governmental activity is the idea of service to the people. It is the only excuse for the existence of your job and my job; and if we acquire the habit of considering the public as a necessary evil incident to our employment, we fail to justify our continuance in office. We cease to be public servants and become instead one of a class of petty bureaucrats.

Measured by this opportunity to serve, there is not an unimportant person or task in the Government service; and, likewise, considering that ours is a government by the people, there is not an unimportant person in the country outside of the Government service. Every individual who has official business to transact has the right to be heard and is entitled to a courteous and complete explanation, if his request is denied.

I have observed that many persons who would not be rude in transacting Government business by personal contact are often guilty of curt incivility in handling matters by correspondence. I do not mean that there is a studied effort to be offensive in writing letters; but, by ignoring the sensibilities of the correspondent, by failing to respond fully to his inquiry, or by overlooking its purport, a positive affront is offered, just as though the letter writer were willfully uncivil.

When this occurs—and I am afraid it does occur many thousands of times daily in official correspondence—we are not rendering a full measure of service. We are creating dissatisfaction and resentment in the mind of the reader. We are making enemies, instead of friends, of the people from whom the powers of government are derived. The cumulative effect of these harmful missives during the course of a year creates antagonism to the government we serve.

We want every correspondent with the Interior Department to feel that his letter receives friendly attention, and therefore urge upon every officer and employee the necessity of writing considerate, intelligent letters to effect this purpose. It is not wholly a question of polite phrasing—in fact, stereotyped politeness should be avoided; but rather it is a display of an understanding of the correspondent's problem and a sincere desire to be helpful.

In illustration of the dividends in good will which one of the bureaus of the Interior Department is receiving through the practice of writing friendly,

concise, intelligible letters, I wish to quote the following excerpts from some received:

* * * I can not refrain from adding that, in an experience of some 30 years in correspondence with Government bureaus, your letter of January is the first human document I have received when I wrote as a total stranger, and I keenly appreciate the sensation. Thank you again for your attention and courtesy.

* * * You are to be complimented on the real human letter you write, and I want to say that such letters are a real credit to your department. How much more pleasing is such a letter to me than many of the very formal ones I have received from some of the departments at Washington in the past. * * *

The best letter is the one that conveys the thought in the fewest words. The facts should be stated simply, directly, and courteously, judgment being used to avoid abruptness and obscurity. But the writer should keep away from reiterations and the recounting of unnecessary details.

The first paragraph should *not* contain a digest of the letter under reply, or recite all action previously taken in the case, only sufficient information being given to identify the subject matter.

To avoid the impression that the department's action is arbitrary, the reason for such action should be given in every instance, and such expressions as "So far as this department is concerned the case is closed" should be avoided.

Whenever possible avoid the use of technical and stereotyped legal phrases, and shun such formulae as "said contract," "you are advised," "in reply beg to state," etc. Other expressions may be found which will convey the idea that the letter writer has given sufficient individual attention to the letter under reply to enable him to express himself in a direct and original way.

In preparing letters for the Secretary's signature, it should be remembered that the Secretary is presumed to know the business of his department, or at least may acquaint himself from the original source with such information as relates to the subject matter of the letter. Furthermore, many of such letters are in the nature of an appeal over the action of bureau officers, and to make the Secretary the mouthpiece of the bureau officer who may have passed upon the case previously is inappropriate and undignified. Expressions which convey this idea, such as "Your letter was referred to the Commissioner of ———, who reports that * * *," "I am informed by the Commissioner of ———," "The commissioner further states," etc., should not be used, but the statements should be made directly as coming from the Secretary.

In mentioning the bureau it should always be identified with the Interior Department, because, strange as it may seem, many people believe that some of the bureaus are independent establishments. I want to bring the important work of the Interior Department before the people of the country, and this can only be done by crediting to the department all bureau activities.

I wish to have the cooperation of everyone in the Interior Department who writes official communications in making them less "official" and more friendly and intelligible, and in this respect the let-

ters signed by the Assistant Secretaries and the bureau officers are just as important as those prepared for the Secretary's signature. Remember, too, that promptness in answering letters is a virtue, and the favorable effect on the correspondent can not be overestimated. We are out to make friends for the Interior Department, and our only means of contact with many potential friends is through the medium of correspondence. Let us make a favorable impression by the character of our letters.

Very truly yours,

HUBERT WORK, *Secretary.*

PATHFINDER RESERVOIR OPERATIONS.

By Andrew Weiss, Project Manager, North Platte Project, Nebraska-Wyoming.

THE Pathfinder Reservoir is one of the principal features of the North Platte project. It is formed by the Pathfinder Dam located on the North Platte River 47 miles southwest of Casper, Wyo. The dam is built of uncoursed cyclopean rubble granite masonry. It is of the arch type with center-line radius 150 feet; its length on top is 432 feet and on the bottom 80 feet. Its total height above the foundation is 214 feet, the top width is 14 feet, and the bottom width 90 feet. A spillway, 600 feet in length with a weir crest, is cut in the rock abutment on the north side of the dam. South of the dam a saddle, the lowest point of which was 20 feet below the spillway crest, is covered with an earthen dike reinforced with a concrete core and faced with heavy granite paving. This dike is composed of heavily compacted earth in the upstream portion of the prism and similarly of compacted gravel in the downstream two-fifths of the cross section.

DRAINAGE AREA.

The drainage area above the reservoir is 12,000 square miles. The mean annual run-off at Pathfinder for the past 20 years is about 1,465,000 acre-feet. The maximum recorded during this period is 2,426,180 acre-feet and the minimum 813,415 acre-feet. The accompanying hydrographs show the annual fluctuations which have occurred on this reservoir during the past 10 years or since the system of hold-over storage has been in effect. The area of the reservoir at spillway level is 21,774 acres and the contents at this level 1,070,000 acre-feet.

DISCHARGE CONTROL.

The discharge is regulated by means of six balanced valves of the Ensign type located in a tunnel passage around the south abutment of the dam; two additional balanced valves of similar type, but greatly

improved design, control the discharge from a tunnel passing through the granite abutment on the north side.

WARREN ACT PURCHASES.

Even a superficial study of the unregulated flow of the North Platte River disclosed the fact that the direct irrigation from this supply was limited to a comparatively restricted area and a system of early cropping. Recognizing this condition, the greater number of the valley canals, particularly those occupying the bench lands suited to the growing of alfalfa and root crops, requested the privilege of sharing in the benefits of this reservoir by the purchase of permanent storage rights therein. In order to meet this general need, contracts for various deliveries of water needed were entered into with private ditch organizations near the close of 1912, under the provisions of the Warren Act as shown by the following statement:

Warren Act contracts, North Platte project, active March, 1923.

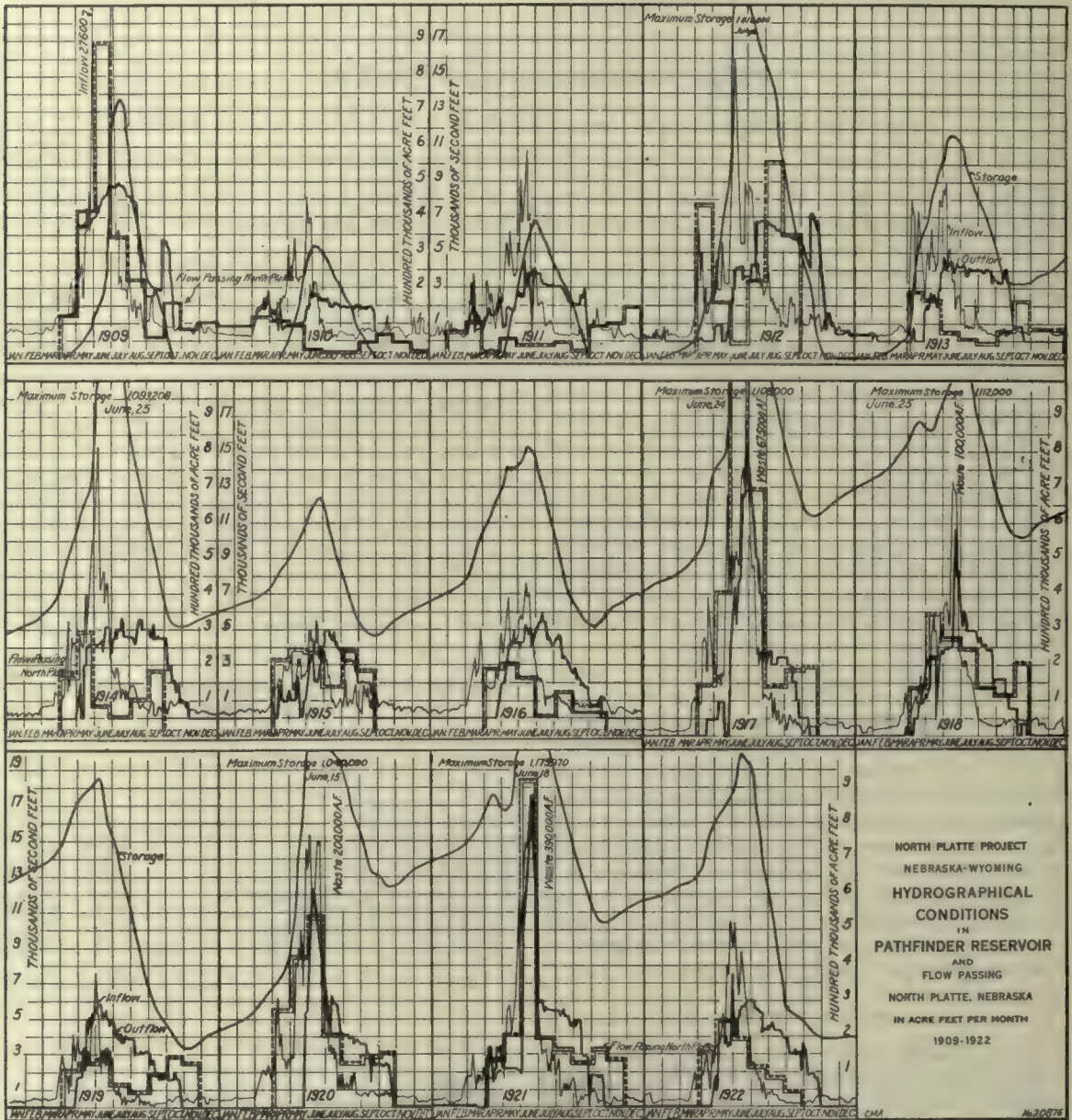
Name of organization.	Acres.	Contract value.
Beerline Irrigation Canal Co.....	550	\$5,040.00
Browns Creek Irrigation District.....	7,500	61,900.00
Central Irrigation District.....	1,500	12,275.00
Chimney Rock Irrigation District.....	3,900	32,900.00
Gering Irrigation District.....	14,000	100,000.00
Farmers Irrigation District (Tri-State).....	60,000	500,000.00
Bridgeport Irrigation District.....	15,000	77,620.00
Lingle Water Users' Association.....	12,000	114,520.00
Pleasant Valley Lateral Association.....	3,650	35,860.00
Lincoln Land Co.....	950	9,705.00
Total.....	119,050	949,820.00

EFFECT OF THE OPERATION OF THE RESERVOIR UPON THE RIVER FLOW.

In the earlier years of the operation of the reservoir much opposition was manifested by owners of

riparian and irrigation rights in the lower portions of the North Platte River and in the Platte Valley between the cities of North Platte and Kearney, Nebr. It was argued that the withdrawal of the flood waters which had in prior seasons risen to sharp peaks during May and June was a distinct damage to the agricultural interests in those sections by lessening the subirrigation which they claimed had previously benefited them. It was also noted that the river bed itself was rapidly being changed from a

stretch of level sand from 5,000 to 6,000 feet in width into a cluster of islands covered with willows, cottonwoods, and shrubbery, between which islands the river divided itself into a number of primary and secondary water courses. This development was viewed with much concern by old residents, who thought that it was the beginning of the closing stages of the river itself. The growth and development of these willow and cottonwood islands was prevented in the early and uncontrolled stages of the river by



reason of the succession of floods and alternate drouths destroying all vegetation within the confines of the river channel.

During the latter part of the summer the river bed below the city of North Platte would frequently remain dry for days and weeks at a time. This condition has been changed to one of comparative stability of flow throughout the summer season and the river channel itself is now in much better physical condition to conserve the water during these low water periods. This is further augmented by the development of a remarkable return flow from the irrigated sections and drainage developments farther west. This is also indicated by the diagram showing the amount of water which has passed North Platte, Nebr., during the summer seasons for which gauging records are available. From this curve which shows the flow in acre-feet per month past North Platte station, it may be seen that whereas in 1910, a year which had a total run-off at Pathfinder of 871,071 acre-feet, the river was practically dry for several weeks at North Platte; in 1919, a year with a lower run-off amounting to 813,415 acre-feet at Pathfinder, the lowest on record, and with a total rainfall from May to August, inclusive, in this portion of only 3.79 inches, the flow past North Platte station was constant and sufficient to supply five or six projects irrigating in the aggregate approximately 25,000 acres.

Public sentiment has changed to one of friendly cooperation with the Reclamation Service. It has resulted in substantial appreciation of the benefits of storage as evidenced by the subscription to a fund of \$20,000 to cover the cost of a survey and investigation, lately completed, for development of the lower Platte Valley by means of storage and the building of the necessary carrying and distributing works.

The accompanying hydrographs are self-explanatory and show the operations of the reservoir for the years indicated. Some modification will be made in these operations in the future, owing to the enlarging of the territory to be covered and the building of supplemental storage at Guernsey, Wyo., tentative plans for which have been approved.

Boise Project Optimism.

Project Manager Bond, of the Boise project, Idaho, states that "the beginning of farming operations and other spring activities has somewhat stimulated business. The evidence is slowly but gradually growing that there is an upward tendency, and the spirit of doing with as little as possible and of paying as you go, with as small an amount of capital as essential, is having the effect of making everyone forget the past and start out anew on a safe basis to pay off indebtedness accumulated and build up a reserve for the future."

Salt River Project Described in Verse.

Mr. Berton Braley, the well-known American poet, recently motored across the United States and wrote daily for the NEA Newspaper Syndicate a poem concerning his travels. From Phoenix, Ariz., he described the Salt River Federal irrigation project in the following verses:

U. S. RECLAMATION ENGINEERS.

Here, where once a desert lay, desolate and bare,
Now a glad green country smiles, opulent and fair;
Floods that thundered madly down, raging through
the land,

Now are held and leashed by man, serving his command.

So a miracle appears,
Where the cactus ruled for half a million years,
Over dusty trails forlorn,
Now there's cotton, wheat, and corn.

Thanks to U. S. Reclamation engineers;

Here where lean coyotes howled, where mesquite had spread

Over league on barren league, thirsty, bleak, and dead,
There are farms and villages, churches, homes, and schools,

All because the engineers learned to use their tools.
So a miracle—a miracle appears.

And the driest land upon the hemispheres

Comes to blossom as the rose,
Growing everything that grows,

Thanks to U. S. Reclamation engineers.

Manna in the wilderness, water on the plain,
That's what engineers have brought to this broad domain.

Dam and ditch and deep canal where the waters run,
They have wrought their magic under Arizona's sun.

So a miracle—a miracle appears,
And the desert wind that withers up and sears,
Has become a gentle breeze,

Sighing gently through the trees,

Thanks to U. S. Reclamation engineers.

UMATILLA'S FUTURE.

By Prof. R. G. Dykstra, Imbler, Oreg.

ONLY a few years ago Umatilla was thought to be a waste of sagebrush and sand from which no sound emanated save the lonesome howl of the coyote and beating of waves of the mighty Oregon upon the basalt rocks as it rolled onward to the sea.

To-day the wonderful achievement in many lines of endeavor reveals a few of the resources once unknown. Since there has been a marvelous increase in the control and adaptation of electricity, with a possibility of some day utilizing the water power, material could be furnished for electrifying all the Columbia railways and near-by cities. *Thousands of acres of idle land, needed by the returned soldiers could be irrigated by the construction of a dam at the Umatilla Rapids.*

In this way industrial undertakings would have placed at their command the double provision of irrigation and electric power. And this section, once

thought to be arid sagebrush tracts, would be transformed into a teeming, populous empire, beyond the comprehension of those unfamiliar with such conditions.

With these possibilities, rich will be the harvest of this section. Great will be the destiny of this fast-growing inland empire, the future of which, as yet, we can but faintly picture.

COSTS ARE COMING DOWN.

Cost statements for the calendar year 1922, recently issued by the Denver office, show reductions in costs in all lines of work under the years 1920 and 1921. The following comparative tables for the service as a whole show costs covering incidental operations. Other tables will be published later showing cost of construction work.

Table 1 gives quantities for the year. The operation of corrals, which shows a reduction in horse-days from 1920 to 1922 of nearly 50 per cent, means three things: First, that the water users are cooperating with the service to a greater extent than before in furnishing work teams when needed by the service; second, this cooperation has made it possible to cut down the number of Government stock held to some extent to take care of emergency repairs; and third, the use of machinery in maintenance work.

Operation of automobiles and 1-ton trucks shows a reduction in mileage traveled, and although more machines are in use, by careful supervision of the use of them unnecessary travel is eliminated.

TABLE 1.—Quantities.

Class of work.	Unit of measure.	1920	1921	1922
Operation of corrals...	Horse-days....	269,662	236,162	149,781
Operation of light-weight autos.	Miles.....	2,343,139	2,768,026	2,334,401
Operation of medium-weight cars.	.....do.....	229,622	292,294	282,243
Operation of 1-ton trucks.	.....do.....	480,719	602,573	538,571
Operation of storehouses.	Amount issued.	\$1,531,091	\$2,723,215	\$2,145,584
Operation of mess houses.	Man-days....	220,352	264,711	224,555
Operation and maintenance of irrigation system.	Acres irrigated	1,059,334	1,093,970	1,051,261

Table 2 shows the amount of cost in dollars incurred in each of the operations shown in Table 1. Costs in 1922 are less in every instance than in 1920 or 1921, with the exception of storehouses, but this is explained by the fact that over 40 per cent more supplies were handled during 1922 than 1920.

The cost of general expense as shown here includes administrative expense at Washington, Denver, field legal offices, and project headquarters. The reduction from 1920 to 1922 is especially gratifying. The last item of Table 2 is the one that vitally affects the water users, who, no doubt, will be interested to see

that the average cost for the service covering operation and maintenance has been reduced from over \$3,100,000 to about \$2,250,000. This means a large saving to the water users and also allows more funds for new construction.

TABLE 2.—Amount expended, in dollars.

Class of work.	Unit of measure.	1920	1921	1922
Operation of corrals...	Horse-days....	\$304,136	\$226,110	\$108,374
Operation of light-weight autos.	Miles.....	230,740	254,905	202,884
Operation of medium-weight autos.	.....do.....	32,808	39,608	31,203
Operation of 1-ton trucks.	.....do.....	87,333	95,876	77,845
Operation of storehouses.	Amount issued	124,817	196,730	148,061
Operation of mess houses.	Man-days....	332,488	324,610	255,175
General expense.....	In dollars of cost.	1,061,579	931,115	748,779
Operation and maintenance of irrigation system.	Acres irrigated	3,120,121	2,791,978	2,227,236

Table 3 gives unit costs and is the best index to costs. This table shows reduction in every item for 1922 under the two previous years. See the big drop

TABLE 3.—Unit costs in dollars and cents.

Class of work.	Unit of measure.	1920	1921	1922
Operation of corrals.....	Horse-days....	\$1.13	\$0.96	\$0.72
Operation of light-weight autos.	Mile.....	.098	.092	.087
Operation of medium-weight autos.	.....do.....	.143	.136	.111
Operation of 1-ton trucks.....	.....do.....	.181	.159	.145
Operation of storehouses.....	Amount issued	.082	.07	.069
Operation of mess houses.....	Man-days.....	1.51	1.23	1.14
General expense.....	In dollars of cost.	.113	.089	.088
Operation and maintenance of irrigation system.	Acres irrigated	2.95	2.55	2.12

in cost of operation and maintenance per acre irrigated and also the reduction in general expense.

A series of potato-grading schools was held recently in the vicinity of Spokane, Wash., at which demonstrations were given of the most approved methods of grading potatoes. The growers plan to pool their potatoes, sending only the graded ones to market and using the culls for stock feed.

RECLAMATION LAW NOTES.

By Ottamar Hamele, Chief Counsel, Reclamation Service.

Power Irrigation Districts in Arizona.

IF it appears that lands sought to be included in a power irrigation district are arid and susceptible of irrigation, the principles upon which a gravity irrigation district is upheld are applicable and constitute the power irrigation district a public purpose for which the imposition of taxes or the issuance of bonds is valid. But Arizona Laws, 1915, chapter 49, as amended by Laws, 1919, chapter 133, and Laws 1922, chapter 19, if deemed to authorize the organization of power irrigation districts, is defective, in that it contains no provision for a hearing where the question of benefits might be determined. (*Kinne v. Burgess* (Ariz.), 211 Pac. 573.)

Conditional Water Contract Interpreted.

In a contract between an electric company and a landowner to furnish a named amount of water for irrigation, where no land was described to which a right might attach, and the owner could utilize the water on any lands then owned or which he might thereafter own or lease, the contract being for the owner's personal benefit with a provision against assignment without permission of the company, and there being no ditch or other fixed source mentioned in the contract to which any water right could attach as a servitude, the rights conferred were too indefinite to constitute a water right which could be held as a servitude on the company's water system. (*Gause v. Pacific Gas & Electric Co.* (Calif.), 212 Pac. 922.)

Irrigation District Not Liable For Negligence of Its Agents.

An irrigation district organized under the Wright Act or California irrigation district act must be deemed a public agency created for a public purpose, and is not subject to an action for damages resulting from the negligence of its officers or agents, in the absence of a statute expressly imposing such liability. A complaint for the wrongful death of a minor child, brought against an irrigation district on the ground of negligence of the agents of the district in leaving sacks of cement on a highway, whereby the automobile in which decedent was riding was overturned, held not to state a cause of action against the individual trustees, who did not participate in nor encourage the act of negligence that resulted in the injury nor have any knowledge thereof, whatever

negligence existed being the result of the acts of subagents or employees of the district. (*Whiteman v. Anderson-Cottonwood Irr. Dist.* (Calif.), 212 Pac. 706.)

Easement For Irrigation Ditch Across Another's Land.

A parol license for the construction of an irrigating ditch over the licensor's land, which is executed by the construction of the ditch by the licensee, becomes in all essentials an easement upon licensor's land continuing for such time as the use of the ditch may continue. A purchaser of land is charged with notice of the claim of an easement by one who had openly constructed and was maintaining a ditch across the land, and, if such purchaser chose to rely upon the vendor's statement there was no easement, without inquiring of the owner of the ditch, he can not claim to be an innocent purchaser. (*Cairns v. Haddock* (Calif.), 212 Pac. 222.)

Prescriptive Right to Water in California.

One claiming a prescriptive right to the use of water from a stream has the burden of showing the quantity to which he is entitled. The quantity of water acquired by one by prescription is not determined by the capacity of his ditch or the flow therein, but is limited to the amount applied to beneficial use; that is, actually used and reasonably necessary for the useful purpose to which the water has been applied, the amount necessary being a question of fact in each case and not being shown merely by the amount used. A prescriptive right to use continuously a certain quantity of water is not acquired by using it part of the time. A judgment for a certain quantity of water by prescription, not limiting the use of the water to any particular time or season, is to be considered one for continuous use. The carrying capacity of a ditch, relative to the amount of water diverted and claimed under a prescriptive right, is to be tested by such capacity at its smallest point. (*Pabst v. Finmand* (Calif.), 211 Pac. 11.)

Conservation of Water in Idaho.

One who, by constructing artificial works, prevents the loss of water flowing in a stream and augments the amount of water available from it, has the right to use the water so conserved. One diverting water from a stream must so construct his ditch as to pre-

vent unreasonable loss. (*Basinger v. Taylor* (Idaho), 211 Pac. 1085.)

Percolating Water in Idaho.

The constitution of the State of Idaho does not make all waters within the State public waters and subject as such to appropriation under its laws. The constitutional right to divert and appropriate water does not extend to private waters. Public waters of the State consist only of such as flow in their natural channels, including the waters of natural springs and lakes. It does not enumerate or include percolating waters. Such waters which exist in the earth belong to the soil as a part of the realty and may be used and controlled by the owner to the same extent as the land itself. (*Public Utilities Commission v. Natatorium Co.* (Idah), 211 Pac. 533.)

Irrigation Easement by Prescription in Montana.

The requirement that an easement acquired by prescription shall show a continuous use for the prescriptive period is met where claimant used an irrigation ditch and the waters flowing therein whenever needed, without regard to the rights of others, during the irrigation season of each year only, for the prescriptive period; constant use throughout the year not being necessary. (*Glantz v. Gabel* (Mont.), 212 Pac. 858.)

Maintenance of Laterals by Nebraska Irrigation Districts.

An irrigation district is a public corporation; its funds are derived from the taxation of all land within the district, and the main purpose of its organization is to furnish water for the purpose of irrigation to all the landowners within the district upon fair and equitable terms and conditions. Lateral ditches are often necessary portions of the irrigation works of an irrigation district, and, where necessary, should be provided, maintained, and supervised by the district in order that a just apportionment of water to each landowner may be made. Owners of land within the district may provide and control such laterals themselves if the district fail to do so, and they can agree among themselves as to the proper upkeep of the laterals and the equitable division of the water. If, in the case of such a lateral constructed by the landowners, it is not kept in repair, and contentions arise between such landowners, some receiving more water from the lateral than their just share and others little or no water when entitled to the same, the landowners who are deprived of water may, by writ of mandamus, compel the directors of the irrigation district to take such steps as to provide them with their just share of the water and to supervise the distribution of the same. (*State ex rel. Clarke et al. v. Gering Irr. Dist. et al.* (Nebr.), 192 N. W. 212.)

Limitations on Expenditures by Directors of Irrigation Districts.

Directors of an irrigation district in Oregon possess no power to incur liability upon the district for the purpose of providing a picnic, for compensation to an attorney for services rendered prior to its organization, or for paying the expenses of any person while attending an irrigation congress. (*Northern Pac. Ry. Co. v. John Day Irr. Dist.* (Oreg.), 211 P. 781.)

Competitive Bids for Construction by Oregon Irrigation Districts.

Irrigation district act, section 37, as amended by Laws 1911, page 390, section 11, calling for competitive bids for the construction of canals, reservoirs, or works of the district after notice by publication, is not permissive, but mandatory, and a contract for construction of irrigation works entered into by the district without advertising for bids is invalid. Contractors dealing with irrigation districts are charged at their peril with knowledge of the authority of the board of directors. Under a statute requiring competitive bids for public contracts, that mode is exclusive, and must be followed, or else the contract is void. Such contract could not be ratified by the district without complying with the provisions of the statute as to competitive bids. Where the construction company performed work for the district thereunder, the district was not liable as upon an implied contract, and was not estopped to set up the invalidity of the contract as failing to comply with the mandatory provisions of the irrigation district act. (*Twohy Bros. Co. v. Ochoco Irr. Dist.* (Oreg.), 210 Pac. 873.)

Assessments by Oregon Irrigation Districts.

The following points of law relating to the power of assessment of irrigation districts in the State of Oregon were decided by the supreme court of that State in *Northern Pac. Ry. Co. v. John Day Irr. Dist.* (211 Pac. 781), to wit:

Irrigation district law, section 24 (Or. L., sec. 7328), providing for special assessments on the lands within the district for the ensuing year is not a violation of Constitution, Article I, section 32, or Article IX, section 1, insuring equal and uniform taxation, since those sections have no relation to special assessments for benefits to the property.

An irrigation assessment per acre of each irrigable acre within the district is not a violation of Constitution of United States, amendment 14, guaranteeing equal protection of the laws, as taking without due process of law.

An irrigation district assessment is not within the limitation to tax for governmental purposes imposed by the 6 per cent limitation tax amendment (Constitution, Art. XI, sec. 11).

On the same subject, in the Northwestern Improvement Co. v. John Day Irr. Dist. (286 Fed. 204), the United States district court holds:

Oregon irrigation law, section 24, in providing that the directors of an irrigation district shall assess the cost of construction and maintenance of the irrigation system equally on each acre of irrigable land in the district, is not unconstitutional, as depriving an owner of his property without due process of law, because it may be shown that some acres are benefited less than others.

Rotation in Use of Water in Utah.

Where the flow of the water in a stream is reduced during certain seasons so that in case a division thereof is made it will no longer reach and benefit the lower user, and where in case the entire flow of the stream is permitted to continue to flow therein it would reach and benefit the lower user, then the court should require the upper user to use the whole flow of the stream a certain portion of the time and require him to permit all the water in the stream to flow down to the lower user a certain portion of the time so as to serve the best interests of all users and so as not to waste water. (*Dameron Valley Reservoir & Canal Co. v. Bleak (Utah)*, 211 Pac. 974.)

Utah Water Rights Act Constitutional.

Water rights act, Laws 1919, chapter 67, provides for the bringing of actions to determine the rights to the use of water and to make all persons who use water or claim right in the water of any particular stream parties thereto, and in providing for notice by personal service, publication, and by registered mail and giving opportunity to obtain relief in case interested parties have not had personal service, the requirement of due process is met. Sections 32 and 33 of this act, providing that the State engineer shall, after investigation, formulate a proposed determination of the rights to use water and mail notice thereof to all claimants interested, and that, if no contest is made, the court shall render judgment in accordance with such proposed determination, does not confer judicial powers on the State engineer, as claimants after notice may file objections and judgment will be entered in accordance with the evidence, and if no objection is made, a claimant by his silence confesses statements contained in the determination. (*Eden Irr. Co. v. District Court (Utah)*, 211 Pac. 957.)

Waste Water From Okanogan Project.

About one-half of the water in Elgin Canyon Creek, which flows through the Okanogan Federal irrigation project in Washington, is waste water from that project and comes from another watershed by artificial means. The Supreme Court of the State of Washington in *Elgin v. Weatherstone* (212 Pac. 562) holds that such water is vagrant waste water, does not become a part of the natural flow of Elgin Canyon

Creek after entering it, and may be used by the first person taking it from the stream, but that use of such water in one year does not give the user a right to it a second year, the vagrant waste waters of yesterday not being those of to-day.

Riparian Rights in State of Washington.

A claim to the water of a creek, filed by a landowner at a time when there was no law permitting him to acquire rights in that manner, was of no effect. No appropriation of water could be made after the passing of title to the land through which the stream flowed from the Government to a railway company, as there can be no appropriation except as against public lands. The common-law doctrine of riparian rights is the established rule in Washington. Under the common-law doctrine of riparian rights, a riparian owner can not use the water of the stream to the exclusion of the other owners or make an unreasonable use of the water. (*Smith v. Nechanicky (Wash.)*, 211 Pac. 880.)

Proofs by Entrymen.

The act of February 23, 1923 (Pub. No. 435), amends section 2294 of the United States Revised Statutes relating to homesteads by permitting proofs to be made by entrymen outside the county and land district in which the land is located "in cases where, because of geographic or topographic conditions, there is a qualified officer nearer or more accessible to the land involved."

Sugar Beets on Irrigated Land.

The tops and crowns of sugar beets are equal to an average cutting of alfalfa, with a grain ration added, in making beef and mutton.

An acre of beets will furnish 7 to 15 tons of tops for ensilage.

The beet pulp and molasses by-products from the sugar factory make excellent and cheap feed for stock—pulp for old ewes and old cows and molasses for hogs and horses.

Sugar companies keep expert agriculturists in the field to help the farmers without cost to the farmer.

Sugar beets make a paying crop for young orchards.

Keep one-fourth of your farm in sugar beets and after your crop rotation gets to working you will harvest as much from the remaining three-fourths as you do now from your entire farm.

Most irrigation projects are well fitted by soil, water, and climate for successful beet growing.

Sugar beets are a good crop for small farms.

Sugar-beet districts are prosperous farming communities.

It is easy for a beet grower to get credit at the bank.

Handling of sugar beets requires good horses and good roads, and both are found in sugar districts.—*I. D. O'Donnell in Irrigation Review.*

ADMINISTRATIVE AND STATISTICAL PROGRESS REPORTS FOR MARCH, 1923.

Monthly conditions of Principal Reclamation Service Reservoirs for March, 1923.

[Elevation above sea level.]

State and project.	Reservoir.	Available capacity in acre-feet.	Elevation.		Storage in acre-feet.			Out-flow in acre-feet.	Elevation of water surface.		
			Spill-way crest. ¹	Lowest gate sill. ²	Beginning of month.	End of month.	Maximum.		Beginning of month.	End of month.	Maximum.
Arizona, Salt River.....	Roosevelt ³	1,305,000	2128.1	1924.6	578,608	689,080	690,507	.....	2092.78	2102.64	2102.76
California, Orland.....	East Park.....	51,000	1199.68	1111.68	41,910	46,675	46,675	.....	1194.45	1197.28	1197.28
Idaho:											
Boise.....	Arrowrock.....	280,000	3211	2956	52,130	59,400	59,400	16,120	3098.3	3104.5	3104.5
	Deer Flat.....	177,000	2518	2488	85,536	136,118	137,737	.....	2507.4	2514	2514.2
Minidoka.....	Lake Wolcott.....	95,180	4245	4236	88,900	89,360	89,600	358,631	4244.46	4244.5	4244.52
	Jackson Lake.....	847,000	6769	6728	367,460	393,790	393,790	.....	6748.85	6750.04	6750.04
Montana:											
Milk River.....	Nelson.....	70,000	2222	1950	25,300	24,400	25,300	.....	2211.8	2211.46	2211.8
St. Marys storage.....	Sherburne.....	66,000	4788	4720	.....	.....	.....	.....	.....	.....	.....
Sun River.....	Willow Creek.....	16,700	4130	4084	11,847	11,847	11,847	180	4124.9	4124.9	4124.9
Nebraska-Wyoming, North Platte:											
	Pathfinder.....	1,070,000	5852	5670	341,610	373,830	373,830	3,570	5802.26	5805.26	5805.26
	Lake Alice.....	11,400	4182	4159	5,065	4,322	5,065	.....	4172.4	4171	4172.4
	Lake Minatare.....	60,760	4125	4074	40,282	39,921	40,282	.....	4114.7	4114.5	4114.7
Nevada, Newlands:											
	Lake Tahoe.....	120,000	6230	6224	.....	.....	.....	79,254	6225.83	6225.74	6225.83
	Lahontan.....	273,600	4162	4060	230,180	232,760	237,980	18,822	4157.1	4157.6	4158.2
New Mexico:											
Carlsbad.....	McMillan.....	45,000	3267.7	3241.6	20,500	21,750	21,750	.....	3262.7	3263	3263
Rio Grande.....	Elephant Butte.....	2,638,000	4407	4231.5	1,449,705	1,435,337	1,449,705	46,767	4371.5	4371	4371.5
Oregon, Umatilla.....	Cold Springs.....	50,000	621.5	590	24,900	40,200	40,200	.....	601.98	614.73	614.73
Oregon-California, Klamath.....	Clear Lake.....	462,000	4540	4514	366,000	376,000	376,000	.....	4536.3	4536.7	4536.7
South Dakota, Belle Fourche.....	Belle Fourche.....	203,000	2975	2920	125,750	149,200	149,200	.....	2967.6	2967.6	2967.6
Utah, Strawberry Valley.....	Strawberry.....	250,000	7558	7517	210,500	212,600	212,600	.....	7552.5	7552.8	7552.8
Washington:											
Okanogan.....	Conconully.....	14,400	2230	2232	2,813	3,100	3,100	.....	2258.3	2259.4	2259.4
Yakima.....	Bumping Lake.....	34,000	3426	3389	7,495	2,930	7,495	4,565	3400.2	3393.6	3400.2
	Lake Cle Elum.....	20,800	2134	2122	24,850	26,985	27,285	.....	2134.3	2135.3	2135.4
	Lake Kachess.....	210,000	2258	2192	88,385	98,875	98,875	.....	2224.1	2227.2	2227.2
	Lake Keechelus.....	152,000	2515	2425	76,660	83,675	83,675	.....	2479.6	2483.5	2483.5
Wyoming, Shoshone.....	Shoshone.....	456,600	5360	5132.3	329,203	325,501	329,203	20,100	5338.7	5337.4	5338.7

¹ Or maximum storage.² Or zero storage.³ Zero water depth at elevation 1902.2.⁴ Amount of silt shown by silt survey deducted from original capacity.⁵ Proposed regulation.⁶ Estimated low-water limit under proposed plan of regulation.⁷ Draft for vested power rights.⁸ Elevation of reservoir raised 12 inches by stop logs in spillway.

SALT RIVER PROJECT, ARIZONA.

Water was run in all the canals during March.

The four regular crews in the field, with a daily average of 205 man days and 11 stock days, accomplished the following maintenance work: 13 miles of main canal cleaned; 219 miles of lateral cleaned; 190 old structures repaired; 6,756 linear feet of riprap placed; 28 cubic yards of concrete placed; 1,276 cubic yards of earth excavated; 753 cubic yards of earth embankment placed; 10 miles of canal bank graded; one-half mile of fence moved.

With a daily average of 44 man days and 5 stock days the following construction work was accomplished from maintenance camps: 4½ miles of new waste ditch dug; 2½ miles of new irrigation ditch dug; 20 new structures installed; 64 linear feet of 30-inch concrete pipe placed; 680 linear feet of 24-inch concrete pipe placed; 127 linear feet of 30-inch corrugated-iron pipe placed; 89 cubic yards of concrete placed; 4,174 cubic yards of earth excavated; 434 cubic yards of earth embankment placed; 12 joints of terra-cotta pipe installed in zanjero houses; 10 cubic yards of rock excavated.

The work of widening the eastern canal was completed by the regular maintenance camp.

The P. & H. one-half-yard machine accomplished the following work: 3,710 linear feet of waste ditch enlarged; 1½ miles of waste ditch regraded.

Operation of power system.—Total power generated during month, 5,347,550 kilowatt hours; maximum daily output March 31, 328,750 kilowatt hours; maximum load March 31, 15,705 kilowatts; maximum daily average load March 25, 13,695 kilowatts; highest daily load factor, 93.8 per cent; lowest daily load factor, 62.6 per cent; monthly load factor, 45.7 per cent.

The output of the power system was comparatively low for the month of March owing to the exceptionally sustained flow of the Verde River and the consequent low draft on the Roosevelt Reservoir for irrigation water.

The Roosevelt power plant operated 57.5 per cent of the month. The Cross Cut plant operated continuously. The South Consolidated plant operated 99.8 per cent of the time. The Arizona Falls plant operated 96.1 per cent of the time. The Chandler plant operated 99.5 per cent of the time. The substations operated without trouble.—C. C. Cragin.

YUMA PROJECT, ARIZONA.

The season for lettuce and peas was about over. The latest report on the lettuce crop shipped from

Yuma Valley brought a net to the grower of 87 cents to 71 cents at the packing house; 51 cars of lettuce were shipped during March. It is estimated that 20 per cent of last season's cotton acreage will be volunteered with a view of harvesting early and putting acreage into alfalfa.

Twenty-four and one-fourth miles of canals and drains were cleaned by the Ruth dredges during the month.

Mesa division.—Work was continued on the manufacture of concrete pipe, 7,872 linear feet in sizes ranging from 18 to 45 inches having been completed. Ten structures involving 31 cubic yards of concrete were completed and $\frac{3}{4}$ of a mile of No. 72 flume was 80 per cent completed. Seven thousand and seventy-two linear feet of pipe was hauled from the quarry during the month. The 16-inch Krogh pump was operated 445 hours, pumping 667 acre-feet.

The setting out of citrus trees on about 225 acres was begun on March 25. Citrus fruit trees were in full bloom and fruit setting well.—*R. M. Priest.*

ORLAND PROJECT, CALIFORNIA.

March was characterized by severe north winds and only a trace of rainfall, which created an early demand for irrigation water in excess of the natural flow of Stony Creek. Water deliveries were started on the 9th and continued throughout the remainder of the month. In order to more nearly meet the irrigation requirements of the project, the operation of the East Park feed canal was discontinued on the 18th.

There was a deficiency of about 8 per cent in storage to full capacity at East Park Reservoir at the close of the month, which, together with the abnormally low natural flow of Stony Creek, will probably result in there being only about two-thirds of a normal water supply available for the project during the current season.

Owing to the general demand for irrigation water and the consequent use of the project laterals for irrigation, concrete lining operations were suspended for the season on March 23. The work consisted of placing 10,600 square yards of lining, which results in a total for the season of 78,000 square yards placed on 9 miles of laterals.

In anticipation of March rains, spring plowing of orchards was deferred with the result that the larger portion of the project orchards remained unplowed. The growth of the first crop of alfalfa was generally satisfactory. Grain on the dry-farmed areas in the Orland vicinity showed the effects of lack of moisture and a low crop yield will result unless precipitation occurs early in April. Planting of new orchards in the project continued and the planting for the season was practically all completed during March.—*R. C. E. Weber.*

GRAND VALLEY PROJECT, COLORADO.

Cold, stormy weather during March interfered with all outside work. The snowfall was much greater than normal.

Preparation for farming operations was in progress and conditions were favorable for early planting. The Holly Sugar Corporation reported beet seeding in progress. This company was able to increase the acreage contracted for beets to the point where they plan to operate both the Grand Junction and Delta factories this season.

The operation and maintenance forces were employed in burning weeds, cleaning ditches, and preparing for the operation of the system. Water was

diverted on March 24 and stock and domestic water furnished to water users.

The work on the Colorado River siphon and other reconstruction for the Orchard Mesa irrigation district was continued. On March 17 the cofferdam for the siphon was torn out in order to turn the river over the completed section of the barrel and on March 24 the channel on the east side was closed to permit the unwatering of the remaining portion. A total length of 229 linear feet of barrel had been completed and excavation and forms were prepared for 92 feet additional. All gates had been installed and the excavation of the east incline was in progress.

The removal of 2,500 cubic yards of rock from the flume bench completed the excavation for the flume construction planned for this season. Three hundred and seventy-two linear feet of concrete flume were completed. The relining of the distribution tunnel was continued and 365 linear feet had been rebuilt.—*S. O. Harper.*

UNCOMPAHGRE PROJECT, COLORADO.

The uncollected water rentals due from the season of 1921 on March 31 amounted to \$2,621.20. The total cash collections on March 31 on account of water rentals for the season 1922 amounted to \$88,170.21.

More or less disagreeable weather prevailed during March, and, as a consequence, farming operations were somewhat delayed. The acreage devoted to onions will be increased somewhat over that of the past year and because of the early planting there was some demand for irrigation water.

Miscellaneous riprap work was also done as required on various canals and laterals and much of the spading and cleaning work required on smaller ditches. Improvement work required on the Gunnison tunnel, which consisted in the extension to concrete approaches, was completed during the month.

Work was resumed on necessary repairs to the concrete lining in the South canal. The work on this feature consisted in the pumping out of drops, 3 to 10 inclusive, and in the replacement of floor and repair work to the drop walls. A concrete cut-off wall was placed at the beginning of concrete at mile post 5.8 and washed-in rock removed from the concrete section of the South canal in the vicinity of mile post 2. Work was begun on the grading and dragging of the Loutsenhizer canal banks. The P. & H. drag line was employed on the removal of slides and ditch cleaning in the Delores Creek and Happy Canyon sections. The enlargement of the feeder ditch from Spring Creek to the Montrose and Delta canal was completed, 6,146 yards in all being excavated by the drag line.—*L. J. Foster.*

BOISE PROJECT, IDAHO.

March weather was cool and extremely dry. Wind storms did some damage to winter grain and early spring seeding.

The farmers were busy plowing, seeding, spraying orchards, and cleaning canals. The ground was so dry that preparations were made to begin irrigating early in April. Owing to the dry season, range conditions were not good. This made it necessary to hold both sheep and cattle on winter feed.

The Main canal was operated from the 1st to the 25th for supplying Deer Flat Reservoir. On the 26th water was turned out of the canal for minor repairs before the beginning of the irrigation season. Preparations were made for beginning irrigation early in April. About 1,500 linear feet of the Robinson Hill wood-stave pipe were replaced with reinforced concrete pipe 30 inches in diameter.

The run-off from the Boise River watershed was light until the latter part of the month, when warm days started the water from the snow on the lower hills. The indications were that there will be an average water supply.

Drainage work was continued on the Drew drain near Wilder and on the Upper Mason Creek drain in the upper end of the project. The latter drain was completed on the last day of the month. Preparations were under way to start work with an electrically operated drag line as soon as the transmission lines can be constructed and the transformers secured and installed—*J. B. Bond*

KING HILL PROJECT, IDAHO.

March weather was favorable for construction work, although it was necessary to protect concrete at night for the first two weeks of the month.

Five construction camps were operated, with an average force of 200 men and 20 head of stock.

Repairs to siphon No. 1 were completed and camp moved to the main canal where lining between station 181 and 199 was 90 per cent completed during March. Enlargement of main canal station 500 to 758 was 75 per cent completed. At One Mile flume, gravel lining at the lower end was completed and relief drainage begun. About half of the drainage

work is to be done in April. At Basin siphon the 54-inch lock-joint concrete pipe was placed and back-filled and the inlet structure completed. Work on pumps 1 and 2 was well under way. Placing of the pumps and 250 feet of 12-inch discharge pipe for pump No. 1 remains to be done. Lateral 6 siphon was completed. Lateral 3E siphon was laid and back-filled. Manhole and turnouts are yet to be put in on this lateral. Laterals 4E and 4E (Rice siphon) were completed. Railroad siphon on lateral 4E is yet to be backfilled. Bennett Creek siphon was completed. With the exception of crossing the O. S. L. right of way, lateral 11E siphon is complete. Lateral 3½E was 75 per cent complete and the 1,700 feet rock-lined chute begun. Glenns Ferry wood-stave siphon was repaired. Drop No. 2 on main canal extension and chutes 1 and 2 on lateral 12 were completed. Lateral 12 metal flume was completed except for placing flume metal. Cold Springs metal flume was completed. Inlet, outlet, and pedestals for lateral 10E flume were completed. Excavation of lateral 4E, 5E-A and 1,000 feet of lateral 15E was completed; 12-inch wood-stave siphon on lateral 12A was put in. Repair of McEachern wood-stave siphon was begun.

On the lateral system 4 canal turnouts, 10 flume turnouts, 6 checks, 3 bridges, and 3 lateral check drops were installed. Road was constructed to lat-

Advance crop report, Boise project, Idaho, 1922.

Crop.	Area (acres).	Unit of yield.	Yields.		Per unit of yield.	Values.	
			Total.	Average (per acre).		Total.	Per acre.
Alfalfa hay.	38,654	Ton.	177,808	4.6	\$8.00	\$1,422,460	36.80
Alfalfa seed.	985	Bushel.	4,039	4.1	7.20	29,081	29.52
Apples.	1,390	Pound.	12,510,000	9,000	.0125	156,375	112.50
Barley.	3,050	Bushel.	85,400	28	.84	71,736	23.52
Beans.	55	do.	605	11	3.60	2,178	39.60
Clover hay.	7,100	Ton.	12,070	1.7	8.00	96,560	13.60
Clover seed.	5,790	Bushel.	24,740	6	8.40	291,816	50.40
Indian corn.	6,990	do.	356,490	51	.45	160,420	22.95
Corn sorghum.	50	Gallon.	5,000	100	.80	4,000	80.00
Corn fodder.	410	Ton.	4,510	11	4.00	18,040	44.00
Small fruits.	165	Pound.	990,000	6,000	.06	59,400	360.00
Garden.	625	Acre.	125,000	200		125,000	200.00
Hay.	70	Ton.	210	3	8.00	1,680	24.00
Millet seed.	11	Bushel.	242	22	.75	181	16.50
Oats.	2,425	do.	84,875	35	.50	42,438	17.50
Onions.	75	do.	26,250	350	.43	11,288	150.50
Pasture.	6,100	Acre.	122,000	20		122,000	20.00
Peaches.	115	Pound.	1,150,000	10,000	.03	34,500	300.00
Pears.	30	do.	240,000	8,000	.04	9,600	320.00
Prunes.	630	do.	5,040,000	8,000	.015	75,600	120.00
Potatoes, white.	12,000	Bushel.	3,480,000	290	.10	348,000	29.00
Potatoes, sweet.	2	do.	410	205	1.25	513	256.50
Rye.	190	do.	2,850	15	.34	969	5.10
Wheat.	27,618	do.	883,776	32	.80	707,020	25.60
Pop corn.	80	do.	4,000	50	3.00	12,000	150.00
Sweet corn.	35	do.	1,400	40	2.30	3,220	92.00
Lettuce.	1,150	Crate.	113,850	99	1.50	170,775	148.50
Melons.	105	Pound.	2,100,000	20,000	.0075	15,750	150.00
Less duplicated areas.	7,400						
Total cropped.	108,500	Total and average.				3,992,600	36.80
		Areas.	Acres.		No farms.	Per cent of project.	
Nonbearing orchard.	300	Total irrigable area, farms reported 145,700 ¹ .	120,200	2,700	82.2		
Young alfalfa.	1,700	Total irrigated area farms reported.	112,000	2,700	76.8		
Young clover.	800	Under water-right applications.	106,000		72.7		
Miscellaneous.	700	Under rental contracts.	6,000		4.1		
Grand total irrigated.	112,000	Total cropped area farms reported.	108,500	2,700	74.5		

¹ Nampa-Meridian Irrigation District makes delivery to 25,000 acres of the project's total area. Crops on this area are not included in this report.

eral 9 concrete lined section and hauling of sand and gravel begun.

Manufacture of lock-joint pipe was completed March 3 and the plant dismantled. All pipe was hauled to site.

Repairs were made to structures on Slick and Cold Springs feeder ditches. Water was turned into Slick feeder March 19 for priming Canyon Creek siphon. A small head of water was delivered from Cold Springs feeder for priming Cold Springs siphon. Water was turned in at the head March 14 to prime siphon No. 1.

One field party was employed during the month staking structures, giving grade, and on miscellaneous surveys.—A. M. Raven.

Prevailing crop prices at close of March, 1923.

Project.	Alfalfa hay, per ton.		Barley, per bushel.	Oats, per bushel.	Wheat, per bushel.	Potatoes, per bushel.
	In stack.	Baled at shipping point.				
Salt River.....	\$16.00	\$20.00	\$1.00	\$0.70	\$1.25	.....
Yuma.....	16-18	.....	.....	.....	.....	.....
Orland.....	12.00	15.00	.80	.....	1.20	.....
Grand Valley.....	9.00	12.00	.80	.70	1.15	\$0.40
Uncompahgre.....	8.00	.....	.....	.66	1.08	.36
Boise.....	7.50	10.50	.60	.50	.90	.20
King Hill.....	8.00	.....	.....	.....	.....	.....
Minidoka.....	6.00	9.00	.75	.45	.96	.36
Huntley.....	.....	.....	.....	.....	.....	.....
Milk River.....	7-8	11.00	.35	.60	1.02	.45
Sun River.....	8.00	12.00	.70	.65	1.01	.25
Lower Yellowstone.....	7-10	.....	.38	.28	1.03	.30
North Platte.....	10.00	.....	.....	.....	.....	.36
Newlands.....	8.00	13.00	.....	.....	1.50	.60
Carlsbad.....	30.00	.....	.....	.....	.....	.....
Rio Grande.....	.....	18-20	.....	.....	.....	.....
North Dakota pumping.....	15.00	.....	.38	.....	1.03	.40
Umatilla.....	15.00	20.00	.....	.....	.....	.....
Klamath.....	8-10	.....	.84	.77	1.11	.....
Belle Fourche.....	5.00	11.50	.48	.37	.95	.60
Strawberry Valley.....	11.50	14.50	1.00	.75	1.05	.....
Okanogan.....	.....	.....	.....	.....	.....	.60
Yakima.....	.....	18.00	.....	.....	.....	.52
Riverton.....	10.00	14.00	.75	.70	.83	.45
Shoshone.....	9.50	12.00	.....	.....	.82	.39
Indian projects:	.....	.....	.....	.....	.....	.....
Blackfeet.....	10.00	.....	.31	.48	.87	.....
Flathead.....	12.00	.....	.....	.....	.93	.30
Fort Peck.....	10.00	.....	.....	.26	1.08	.50

MINIDOKA PROJECT, IDAHO.

Dry weather continued throughout March.

Between 100 and 200 applications for relief under the terms of the recent act of Congress were given out to water users and a few of the applications were received.

The results of the election held in January for the formation of the American Falls Reservoir District were confirmed by the court and the directors of the district organized. May 12 was tentatively set as the date for the election on a bond issue to finance participation of the district in the reservoir. A contract between the United States and the district has been prepared and will be voted on at the bond election.

The work of lining the Main South Side Canal at the head of the F waste was about half completed. This work was somewhat delayed by a scarcity of labor. For the same reason only a small amount of

canal cleaning had been done. It was planned to start operation of the pumping system about April 15.

At American Falls some surveys were made of right of way in rural lands.

Some studies were made of the water supply of Snake River in connection with the various reservoirs on the river.—Barry Dibble.

HUNTLEY PROJECT, MONTANA.

General weather conditions prevailing throughout March were favorable to the work in progress.

Maintenance work was in progress, comprising Pryor Creek channel protection, cleaning of main canal at outlet to tunnel No. 1, repair of the Fritz flume, riprap protection for Sand Creek flume, repairs to breaks in various tile drains, and resumption of work cleaning the Reservoir Line canal with the Austin dragline.

Beet contracts already signed by the farmers indicate a material increase in acreage over 1922; approximately 4,300 acres will be planted on project lands and 22,000 acres for the entire factory district.—A. R. McGinness.

MILK RIVER PROJECT, MONTANA.

Winter conditions prevailed throughout March, with the ice still in the river and frost in the ground, but no severe storms.

Maintenance work included repairs to the sluice gate at Dodson Dam.

The office force was largely engaged on preparation of exhibits to accompany proposed contract, approved as to form March 2, to be made with proposed irrigation districts east of Dodson Dam and of maps and lists necessary as a part of the petitions for forming such irrigation districts.—Geo. E. Stratton.

ST. MARY STORAGE.

March weather was such that no field work could be carried on.

The field camps were in charge of caretakers.

The assistant engineer in charge of operation and maintenance and construction work was in the project office during the entire month.—R. M. Snell.

SUN RIVER PROJECT, MONTANA.

March was generally unfavorable for outside work. The construction camp for the repair job on Greenfields main canal was nearly completed and good progress made in screening sand and gravel for this work. Fair progress was made on the relocation of 4½ miles of transmission line from Fairfield westerly along the Greenfields main canal.

Operation and maintenance work was limited to the distribution of poisoned grain to get rid of gophers. Considerable interest was being shown in sugar-beet culture, and everything pointed to the farmers putting in a sufficient acreage in 1923 to give this crop a commercial test. The farmers were engaged in baling hay and marketing crops. The following shipments were made from the three principal shipping stations: Fort Shaw, 5 cars of wheat, 31 cars of hay; Simms, 13 cars of wheat, 17 cars of hay; Fairfield, 3 cars of wheat.—Geo. O. Sanford.

LOWER YELLOWSTONE PROJECT, MONTANA-NORTH DAKOTA.

March was cloudy and disagreeable, and unfavorable for any kind of out-of-door work.

Farmers were making their plans for what crops to raise during 1923. The field man of the Great Western Sugar Co. had secured contracts for the planting of 2,700 acres of sugar beets, and it was expected that this acreage would be increased to about 3,000, or nearly three times the amount in 1922.

One hundred and fifty farm turnouts were constructed and treated ready to be installed. The Ruth ditch cleaner was overhauled and was ready to start as soon as the frost was out of the laterals. Owing to the late spring and shortage of laborers it will be rather difficult for the maintenance organization to complete the program of work planned before irrigation starts.—*L. H. Mitchell.*

NORTH PLATTE PROJECT, NEBRASKA-WYOMING.

On the Interstate division repair work on structures and riprapping canal banks and structures, trapping gophers, and burning weeds were being carried on as weather conditions permitted.

On the Fort Laramie division the canal was operated to the power plant without interruption, and a small force was employed on sluicing sand and building roads on canal banks and riprapping.

On the Pathfinder (storage) division the concrete lining of conduit No. 2 in the South tunnel was completed.

On the Interstate division Main canal enlargement was in progress with two Monighan gasoline drag lines, two P. & H. drag lines, and one Bucyrus class 14 drag line.

On the Fort Laramie division two Bucyrus draglines were employed on canal excavation, one Bucyrus electric drag line on drainage work, and one Austin gasoline drag line at the Horse Creek siphon. This structure was 75 per cent completed. On the Horse Creek lateral system, the east branch of the Table Mountain lateral system and the Main canal between

Horse Creek and the State line, such work as hauling gravel, lateral excavation, and placing concrete was being carried on by contractors and Government forces, the average force employed by both being about 200 men.

On the Northport division good progress was made in cleaning up the odds and ends left on construction work, and equipment and forces were being transferred to the Fort Laramie division.

Red Triumph potatoes were selling for 60 cents per hundredweight. Farmers were beginning spring work, such as hauling manure, plowing, and disking, and a few were seeding. Beet contracts were being signed up at \$5.50 per ton on a sliding scale. It was expected that a large acreage of sweet clover and beets will be planted.

Eight cars of sheep were shipped from Morrill, Nebr., and only a few cars remained to be shipped.—*Andrew Weiss.*

NEWLANDS PROJECT, NEVADA.

Lahontan power plant was operated from both the canal and reservoir.

Temporary timbering of Truckee Canal tunnels 1 and 3 was completed the middle of March; 120 feet of tunnel 1 and 578 feet of tunnel 3 were timbered.

Water was turned into the distribution system during the month and deliveries were made principally for winter grain and young alfalfa.

A total of 18½ miles of laterals were cleaned by hand and team labor. The new Ruth dredger operated over several miles of lateral, cleaning them in a satisfactory manner. Four men were employed continuously cleaning weeds from a total of 31 miles of deep drains.

Three concrete structures, 1 concrete check with steel bents, and 14 redwood structures were completed by operation and maintenance forces. Fourteen minor structures were also repaired.

Crop report, Carlsbad project, New Mexico, 1922.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.	
			Total.	Average (per acre).	Per unit of yield.	Per acre.
Alfalfa hay.....	6,492	Ton.....	16,930	2.61	\$12.77	\$33.32
Alfalfa seed.....	1,629	Pound.....	216,204	133	.12	15.56
Cane.....	84	Ton.....	337	4.01	6.95	27.93
Corn, Indian.....	308	Bushel.....	6,028	19.58	.95	18.51
Cotton, lint ¹	14,130	Pound.....	3,200,000	227	.26	58.88
Cottonseed.....	14,130	do.....	6,400,000	454	.015	6.80
Garden.....	42					52.95
Orchard.....	28					48.05
Pasture.....	877					10.52
Potatoes, sweet.....	7	Pound.....	36,120	5,160	.025	129.00
Sorghum.....	80	Bushel.....	3,030	37.88	.29	11.13
Wheat and oats.....	382	do.....	6,065	15.88	.93	14.80
Less duplicated areas.....	15,759					
Total cropped.....	22,430	Total and average.....				53.41
			Areas.	Acres.	Farms.	Per cent of project.
Young alfalfa.....	240	Total irrigable area farms reported.....		24,995	333	100
Crop failures.....	1,410	Total irrigated area farms reported.....		24,080	333	96
		Under water-right applications.....		24,995	333	100
Total irrigated.....	24,080	Total cropped area farms reported.....		22,430		90
Land not watered.....	915					
	24,995					

¹ 6,400 500-pound bales of cotton.

Work preliminary to the construction of the new steel power penstock at Lahontan Dam was commenced.

Construction of five laterals was completed; 23,040 cubic yards of earthwork were moved, at an average cost of 7.7 cents per cubic yard.

On March 22 advertisement was issued calling for proposals for about 7,500 cubic yards of class I earthwork on construction of new laterals to replace the "Scott" ditch through the city of Fallon. Contract for work was awarded March 31. The average unit price bid was 15.3 cents per cubic yard.

Drainage work progressed satisfactorily. Seven drag lines moved 229,447 cubic yards of material. Six and one-half miles of new drain were completed and 2.4 miles of old drain cleaned and deepened. A total of 64,178 feet board measure lumber was placed in 52 structures, all installed by drainage forces.

On March 3 the department executed the contract with the Canyon Power Co. for the lease of Lahontan power plant. This is of great importance to the project as a whole, since it removes the difficulties previously in the way of construction of Spanish Springs Dam.

More corn will be planted this year than ever before, owing to the rapid development in dairying and the consequent need for silage to supplement the straight alfalfa ration hitherto fed.

Grass pastures were being extensively experimented with this year for the first time.—*John F. Richardson.*

CARLSBAD PROJECT, NEW MEXICO.

March weather was generally cold, with considerable wind. Reports indicated that there was considerable snow over the entire upper watershed of the Pecos River.

Four maintenance crews were employed cleaning the lateral system until about March 15. A team crew was employed cleaning silt from around curves in the main canal and strengthening the banks where they had been eroded by range cattle and sheep. One concrete check was constructed in the main canal between 9 and 10 laterals so that water could be elevated to irrigate high lands next to the canal. Water was turned into the canal for the regular irrigation season on March 27. Owing to cloudy weather little water was used up to the 1st of April.

Farm work consisted of breaking land for annual crops. Irrigation work consisted of irrigating for the plowing of land and young alfalfa fields. Good rains greatly encouraged the cattle and sheep men on the outlying lands and range conditions were good for this period of the year.

Total collections for the month on account of operation and maintenance and construction amounted to \$18,290.11.—*L. E. Foster.*

Crop report Rio Grande (including Palomas and Fort Hancock), 1922.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.			
			Total.	Average (per acre).	Per unit of yield.	Total.	Per acre.	
Alfalfa.....	33,971	Ton.....	107,928	3.17	\$16.11	\$1,739,470	\$51.20	
Alfalfa seed.....	118	Pound.....	20,480	173.55	.197	4,044	34.27	
Apples.....	732	do.....	674,505	921.45	.033	22,200	30.33	
Barley.....	448	Bushel.....	7,848	17.51	.78	6,163	13.75	
Beans.....	1,264	do.....	13,168	10.41	3.63	47,807	37.82	
Beets, sugar.....	43	Ton.....	385	8.91	6.44	2,482	57.40	
Cabbage.....	307	do.....	996	3.23	22.65	22,560	73.37	
Cane.....	2,088	do.....	5,412	2.59	10.81	58,537	28.03	
Cantaloupes.....	881	Crate.....	241,455	274.07	.69	168,385	191.12	
Chili.....	56	Pound.....	66,125	1,180.80	.03	2,287	40.84	
Corn fodder.....	758	Ton.....	1,935	2.55	7.85	15,189	20.03	
Corn, Indian.....	10,905	Bushel.....	233,218	21.38	.87	203,905	18.69	
Corn, cane.....	338	Ton.....	585	1.73	9.60	5,614	16.61	
Corn, sorghum.....	205	Bushel.....	4,086	19.83	.71	2,891	14.03	
Corn, sorghum seed.....	20	Pound.....	10,800	540.00	.02	216	10.80	
Cotton.....	13,319	Bale.....	12,099	.90	121.65	1,471,956	110.51	
Cotton seed.....	13,103	Pound.....	12,658,880	966.10	.012	152,492	11.63	
Flowers.....	20	Acre.....				5,655	282.75	
Fruits, small.....	84	Pound.....	71,830	855.12	.088	6,322	75.26	
Garden.....	3,839	Acre.....				157,950	41.14	
Hay.....	1,409	Ton.....	1,850	1.31	11.06	20,490	14.54	
Oats.....	923	Bushel.....	25,749	27.90	.66	16,961	18.37	
Onions.....	146	do.....	10,594	72.56	1.20	12,754	87.36	
Pasture.....	5,851	Acre.....				61,170	10.45	
Peaches.....	147	Pound.....	23,500	159.86	.017	395	2.68	
Pears.....	955	do.....	100,850	105.61	.06	6,239	6.53	
Peas.....	42	Bushel.....	170	4.05	4.96	843	20.07	
Potatoes, sweet.....	636	do.....	69,478	109.24	1.11	76,962	121.01	
Potatoes, white.....	2	do.....	33	16.50	1.55	51	25.50	
Tomatoes.....	32	Pound.....	62,375	1,949.21	.048	2,994	93.56	
Watermelon.....	232	do.....	831,580	3,584.40	.013	10,746	46.32	
Wheat.....	7,769	Bushel.....	132,997	17.12	1.16	154,830	19.93	
Miscellaneous.....	40					3,792	94.80	
Small truck.....	207					15,318	74.00	
Less duplicated areas.....	16,481							
		Total and average.....				4,479,670	53.06	
Total cropped.....	84,410							
Total other purposes.....	5,180							
Total irrigated.....	89,590							
		Areas.	Acres.	Farms.	Per cent of project.			
Total irrigable area farms reported.....			109,900	3,534				
Total irrigated area farms reported.....			89,590	3,534				
Total cropped area farms reported.....			84,410	3,534				

RIO GRANDE PROJECT, NEW MEXICO-TEXAS.

New project lands were being prepared for cultivation and irrigation at such a rate that major construction activities were directed, during the past months, toward extensions of the distribution system for providing these lands with water service. Nearly all of the new land was being prepared for cotton planting, and the rapid increase in the use of idle land, together with the advanced stage of construction of the drainage and distribution systems gave the project the appearance of one nearing completion with advantage being taken of the constructed works.

In the Rincon Valley one Monighan 1-T excavator continued on the construction of the Garfield drain.

In the Mesilla Valley four dragline excavators were employed on drain construction, excavating 168,632 cubic yards from 3.3 miles of drain. Machines working on this feature consisted of 3 Bucyrus 9½ excavators, 1 Monighan 2-T, 2 P & H excavators, and 2 Ruth ditch-cleaning machines, which were employed on lateral construction; 61,528 cubic yards were placed in 5.2 miles of canal and lateral, and the Ruth ditching machine moved 18,957 cubic yards from 9.4 miles of old laterals in their reconstruction. Structure work consisted of one culvert on drains, and 42 minor structures on drains and laterals.

In the El Paso Valley drainage construction progressed with the operation of one Bucyrus 9½ excavator which moved 47,931 cubic yards from 1 mile of drain. The second Bucyrus 9½ excavator was employed in the vicinity of the Tornillo canal heading on canal excavation and embankment. One Bucyrus 30-B and one P & H excavator were employed on lateral construction. A total of 65,752 cubic yards was placed in 3.5 miles of canals and laterals by machine methods, and 8,594 cubic yards in 0.3 mile by teams. The Ruth ditching machine was occupied with maintenance work on canals and laterals previously constructed, moving 9,900 cubic yards from 10.6 miles of single canal bank. The principal items of structure work included the completion of the Tornillo canal heading, wasteway, and checks. A total of 126 minor structures was installed. Especially in the El Paso Valley were new lands being prepared and brought in, and it is here that the greatest demand for new laterals and structures exist. However, the efforts and desire for bringing in new land were general over the whole project.

Water for irrigation was released from the reservoir during the entire month and was run in all distribution systems for irrigation purposes. Irrigation demands were not very heavy, but a heavy demand was anticipated about the 15th of April when the cotton planters say they want to irrigate their land for the first time. During the month a cold snap occurred lasting about a week and probably some damage to fruit which was in bloom was experienced. However, a large percentage of the fruit growers resorted to smudging, which is a noticeable step in advancement on the project.—*L. M. Lawson.*

NORTH DAKOTA PUMPING PROJECT.

The weather was unfavorable. March was the coldest March in 24 years. Streams were frozen over at the end of the month.

There were delivered 94,050 kilowatt-hours of electrical energy to the city of Williston, which represents an increase of about 2,000 kilowatt-hours over the same month of last year.

Eight hundred and ninety-one tons of coal were mined. With the exception of one room all coal was produced in narrow work, which was advanced to open a new block of coal and provide working places for the irrigation season.—*Wm. S. Arthur.*

UMATILLA PROJECT, OREGON.

March weather was dry and windy. On the 16th and 19th gales accompanied by sand storms did considerable damage, especially to newly graded lands. The Umatilla River reached the flood stage at the end of the month. The feed canal was operated to full capacity throughout the month. At the end of the month Cold Springs Reservoir had available storage of 40,200 acre-feet.

The usual spring work was under way. Preparation of the soil for this year's crops, pruning of fruit trees, and planting of gardens were the chief occupation of the farmers.

Small crews on each division were engaged in maintenance work preparatory to the beginning of the operation season.

One thousand five hundred cubic yards of class 1 material and 150 yards of class 3 material were excavated; 1,760 linear feet of 20-inch concrete pipe, 2,400 linear feet of 16 inch, and 440 linear feet of 12-inch pipe were laid in connection with the lateral extensions under supplemental construction on the East division. About 700 cubic yards of class 1 material were excavated in laterals to serve new units on the West division.

"Feed lambs for profit" was the subject under discussion at the field day held at the Umatilla Experiment Station on March 3. Mr. Dean, superintendent, experimented during the winter on fattening 200 lambs as a means of marketing alfalfa hay. The result showed a profit with hay charged on a basis of \$10 in the stack and grain at \$40 per ton. Visiting speakers from various parts of Oregon participated in the discussion, including Prof. L. E. Potter, Oregon Agricultural College; R. P. Bean, Prosser Experiment Station; and Jerry Sotole, from Washington State College.—*H. M. Schilling.*

KLAMATH PROJECT, OREGON-CALIFORNIA.

March weather was favorable for farming and construction operations. In the Tule Lake division the excavation for the canal system was completed on March 31. For the lateral system the excavation will be completed on about April 20. The structures on the canal and lateral system will be completed early in May. In the Langell Valley division the diversion dam was practically completed on March 31. The greater part of the West canal will be constructed by drag-line excavator; a machine is now available for this work.

Contracts were awarded for building timber bridges for the West canal, Langell Valley division, and for enlarging the vault at the headquarters office. Advertisement was being made inviting bids for building checks and turnouts for the West canal and for constructing a cottage and barn at the lower diversion dam on Lost River.

The farmers generally were taking advantage of the favorable weather and had their spring plowing and planting well under way. The lambing season was well advanced. The shipping of market cattle had practically been completed and other cattle were being moved to the summer range. The sheep and lambs will be moved to the summer range in the near

future. The project hay crop had been largely disposed of and there will be little or no carry over.

The dairy industry is becoming a large factor in project development. The cheese factory at Malin has been in existence only a little over a year, but this institution is well established and has had a flourishing business from the beginning.

The board of review appointed by the Secretary of the Interior to consider costs and other matters pertaining to the Tule Lake lands was in session from March 21 to 31. The board consisted of D. C. Henny, consulting engineer, United States Reclamation Service; F. B. Headley, superintendent of the experimental station at Fallon, Nev.; and Alfred Collier, local lumberman and representative of the American Legion.

The board appointed by the Secretary of the Interior to appraise the Ankeny and Keno Canals consisted of Messrs. D. C. Henny, J. A. Gordon, and R. E. Smith. Mr. Gordon is a local banker and Mr. Smith a local real-estate dealer. The board was in session on March 26 and 27.—*Herbert D. Newell.*

BELLE FOURCHE PROJECT, SOUTH DAKOTA.

March was cold, with little severe weather but low average temperature. Moderate winter weather continued to the end of the month.

Roads were passable for cars and were good during the latter 10 days.

The Inlet Canal was operated continuously except on the 30th and 31st, when the water in the river became so muddy that it was unfit to take into the canal; 22,104 acre-feet were diverted from the river, 526 feet of which were wasted at Crow Creek.

A small crew worked part time in the Orman district replacing unsafe timbers in the Indian Creek flume. The foreman of that division and his gate tender were employed building forms and cutting steel for the improvement to parapet wall of Belle Fourche Dam.

In the Newell division a small crew worked part time repairing Horse Creek flume; the foreman and one helper hauled gravel for the replacement in concrete of old wooden chutes and the blacksmith put in most of the month repairing the 46-inch steel forms for concrete pipe.

In the Vale division the foreman and five men made extensive repairs to the substructure to the Stinkingwater flume which with other recent repairs makes practically a new structure of creosoted fir. No earthwork could be accomplished owing to the unusually cold March weather and the continuance to the end of the month of considerable frost in the ground.

Owing to the late spring there was little demand for labor, but it was apparent that the supply of common labor will be limited and the price higher than for last year.

The live-stock business was looking up on the project and in this section of the country generally. The excellent price received for fat lambs and the high price offered for wool (50 cents at the end of the month), together with a fair price for feeder hogs, were causing all farmers who have a fighting chance to take new courage. It will, however, take several years of good crops and good prices to deliver them from the 10 per cent interest handicap.

Four auction sales of registered Duroc-Jersey hogs were held recently and much interest was shown. Prices for 1-year-old gilts ran from \$30 to \$75 and one 2-year-old sow sold for \$175. Farmers were all agreed that their only salvation financially lies along the line of feeding everything they raise and marketing the finished project.—*B. E. Hayden.*

STRAWBERRY VALLEY PROJECT, UTAH.

The fore part of March was generally stormy and cold, the latter part fair and mild and favorable for farming operations. The major part of the spring plowing had been accomplished; sowing of grain was

Crop report, Klamath project, Oregon-California, 1922.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.			
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.	
Alfalfa.....	15,866	Ton.....	43,124	2.72	\$8.00	\$344,995	\$21.73	
Barley.....	949	Bushel.....	23,975	25.30	.66	15,823	16.67	
Garden.....	62				48.00	2,976	48.00	
Hay.....	774	Ton.....	1,886	2.44	8.00	15,089	19.50	
Oats.....	1034	Bushel.....	33,010	33.50	.59	19,475	19.79	
Pasture.....	9,270				5.75	53,305	5.75	
Potatoes.....	393	Bushel.....	38,255	97.30	.45	17,214	43.79	
Rye.....	587	do.....	4,824	8.20	.66	3,183	5.42	
Wheat.....	3,637	do.....	66,676	18.30	.96	64,010	17.60	
Miscellaneous.....	428	Acre.....				1,070	2.50	
Total cropped.....	32,950	Total and average.....					537,140	16.30
Not cropped.....	3,050							
Total irrigated.....	36,000	Areas.				Acres.	Farms.	Per cent of project.
		Total irrigable area farms reported.....				42,094	414	100
		Total irrigated area farms reported.....				36,000		85.5
		Under water right applications.....				36,000		85.5
		Not irrigated.....				16,094		14.3
		Total cropped area farms reported....				32,950		78.3

1 Not irrigated—Suspended account seepage, 1,000 acres; farmsteads, 1,200 acres; raw land, 3,894 acres; total, 6,094 acres.

practically completed; and preparation of ground for planting sugar beets was in progress.

The price of farm commodities remained practically stationary, few shipments of grain and cattle being made. Another bonus of 50 cents a ton for all sugar beets raised during the season of 1922 was distributed by the Utah-Idaho Sugar Co.

The power plant was in continuous operation, delivering under contract 95,226 kilowatt hours to the several project towns. Revenues received amounted to \$1,799.02. Two new Woodward governors for the generator turbines were received on the 20th.

Total collections during the month on account of operation and maintenance and construction charges amounted to \$19,154.

The tentative contract for turning over the operation and maintenance of the project to the water users under the irrigation district plan of organization was submitted to the project water users for consideration.—W. L. Whittemore.

Summary of employees for March, 1923.

Projects and offices.	Beginning of month.	End of month.	Increase.	Decrease.
Washington office.....	77	76	.....	1
Denver office.....	60	59	.....	1
Field legal.....	117	117	.....	.....
Examiners of accounts.....	2	2	.....	.....
Yuma.....	174	177	3	.....
Yuma auxiliary.....	87	91	4	.....
Orland.....	71	32	.....	39
Grand Valley.....	167	157	.....	10
Uncompahgre.....	105	150	45	.....
Boise.....	126	226	100	.....
Black Canyon Dam.....	189	243	54	.....
King Hill.....	239	262	23	.....
Minidoka.....	61	91	30	.....
Huntley.....	12	8	.....	4
Lower Yellowstone.....	.....	.....	.....	.....
Milk River.....	30	29	.....	1
St. Mary storage (includes half time of 7 on Blackfoot).....	9	10	1	.....
Sun River.....	33	63	30	.....
North Platte.....	316	352	36	.....
Newlands.....	145	139	.....	6
Carlsbad.....	41	23	.....	18
Rio Grande.....	542	536	.....	6
North Dakota pumping.....	24	23	.....	1
Baker.....	6	3	.....	3
Klamath.....	139	151	12	.....
Umatilla.....	30	20	.....	10
Belle Fourche.....	13	25	12	.....
Strawberry Valley.....	18	18	.....	.....
Okanogan.....	6	24	18	.....
Yakima.....	234	291	57	.....
Tieton Dam.....	343	372	29	.....
Riverton.....	255	253	.....	2
Shoshone.....	236	249	13	.....
Secondary.....	61	74	13	.....
Unassigned per diem.....	26	26	.....	.....
INDIAN.				
Flathead.....	112	165	53	.....
Fort Peck.....	6	7	1	.....
Blackfoot (exclusive of half time of 7 on St. Mary).....	3	6	3	.....
Total.....	4,015	4,480	557	92
Net increase.....	.....	.....	465	.....

¹ Exclusive of 3 in Denver office.

OKANOGAN PROJECT, WASHINGTON.

March weather was generally mild and with practically no precipitation. It was ideal for the most part for the ranchers who had pruning and orchard work to do but did not add much to the project water supply in the mountains.

Operation and maintenance work started with some repairs to telephone and transmission lines on the 19th; on the 21st repairs were started on the Robinson Flat pumping plant, and on the 22d a small crew was started cleaning silt from the canals and laterals.

Transportation conditions remained good, and all cars that were needed were available for the shipment of fruit.

The sale of the later varieties of apples proved somewhat disappointing to the project growers, as prices were not so good as anticipated earlier in the year.—Calvin Casteel.

YAKIMA PROJECT, WASHINGTON.

The mean temperature for March was about normal, although the weather during the first half of the month was unusually cool.

Granger irrigation district.—Good progress was made on the Granger siphon, the percentages of completion on the various features at the close of the month being as follows: Manufacture of 33-inch lock-joint pipe, 44.2; trench excavation, 65.9; hauling of pipe, 25.9; laying of pipe, 23.9; jointing of pipe, 15.9; backfill, gravel, 38.8.

Sunnyside division.—The headgates of the Sunnyside Canal were opened for the season on March 19, and 110 second-feet were diverted for priming. At the close of the month the diversion had been increased to 530 second-feet. A few deliveries were made for spraying of orchards. The pumping plants of the several irrigation districts were tested out, and at the close of the month all were in readiness for the operating season except the Prosser plant, on which a small amount of work remained to be done. Heavy winds filled the canals and laterals with debris, necessitating recleaning in a number of places, which added about \$500 to the cost of the maintenance work. From 10 to 15 teams were employed intermittently on cleaning canals. Work in progress consisted of cleaning canals and laterals, repairing structures, painting pipe and flumes, and puddling new structures.

Tieton division.—Diversion of about 25 second-feet was made from the South Fork of Cowiche Creek between the 5th and 10th for filling cisterns on Yakima Ridge and on unit 3. Similar service to unit 1, begun on the 20th of the previous month, was continued on a rotation basis through the several laterals until about the 18th, utilizing the rather limited supply in the North Fork. Maintenance work on main laterals consisted of cutting and grubbing willows, minor repairs to structures, and erection of rock cribs and other protective work along North Fork Creek channel, and removal of accumulations of gravel to straighten the course in various places. Three crews were engaged on excavation and other preparatory work for the replacement of worn-out wooden flumes with approximately 2,600 linear feet of creosoted wood-stave flume in sizes 24 to 32 inches; 2,100 linear feet of reinforced concrete pipe, 21 and 24 inches diameter; and about 5,000 linear feet of wood-stave and plain concrete pipe (in about equal quantities), sizes 8 to 16 inches. Ten crews of 3 to 5 men each were employed on cleaning sub-laterals.—J. L. Lytle.

TIETON DAM.

The good weather prevailing since March 25 made it possible to get the different features of the work in full swing by the end of the month.

Rock-fill embankment was placed throughout the month, and earth fill since the 27th. Spillway excavation in solid rock made good progress. At the end of the month two shovels were in spillway excavation and one in borrow pit for earth-fill embankment.

Snow in the timber retarded reservoir clearing, but at the end of the month the south slopes were able to be worked to good advantage.

The excavation for the gate chamber in the tunnel was about 30 per cent complete at the end of the month.

The Naches road was worked over with a blade machine and put in good shape for the spring hauling.

The average force employed numbered 338 men.—*F. T. Crowe.*

RIVERTON PROJECT, WYOMING.

March weather was stormy and unfavorable for construction. Roads were in fair condition.

On the Wind River diversion dam drag line 121322 collected and screened gravel for concrete up to March 7. Drag line 121474 prepared surface for the dike and loaded 4,950 cubic yards of material on wagons for the dike. The placing of concrete in the dam was completed on March 27. During the month 549 cubic yards of plain and 554 cubic yards of reinforced concrete was placed. The sluice and head gates were received and the placing of them started. Dismantling of the concrete plant was begun. Six hundred and twenty cubic yards of back fill was placed in the right abutment.

On the first division of the canal drag line 121322 removed 2,255 cubic yards of material trimmed for the lined section and excavated 5,340 cubic yards from the canal below station 30. It also made the excavation for canal turnout at station 63. The bridge at station 13 was nearly completed. Preparations were made for building the culvert at station 30. The canal bank between stations 170 and 245 was leveled off.—*H. D. Comstock.*

SHOSHONE PROJECT, WYOMING.

March was a cold, disagreeable month. At the close of the month much frost remained in the ground and farm work was delayed and drainage excavation in earth impracticable. Roads are rough and some impassable.

At the Willwood Dam the excavation of the second section of the dam was completed and the entire foundation, except for a small portion of the apron, was covered with concrete. The apron, except for this small area, was completed and a little over half the gravity section of the dam had also been completed. The class 14 electric Bucyrus dragline was engaged upon dam excavation until the 24th, when it moved out of the river bottom and stripped an additional gravel pit.

On the Frannie division a class 9½ electric Bucyrus dragline began deepening drain 102 west of Deaver on the 12th. This excavation is in sandrock and required blasting. The erection of a garage at Deaver camp was also begun at the close of the month.

On the Garland division a small crew on minor structure construction began work on the 26th. The class 9½ gas Bucyrus dragline at Willwood bridge renewed excavation work on the approaches on the 29th.

Little maintenance work, except preparing for small structure repairs and bank protection work, was possible, owing to ice and snow in the canals.

The power system was operated throughout the month except for a shutdown on the 17th, due to a

high wind storm entangling the wires on a span of the Willwood branch. The power delivered was as follows: Willwood Dam construction work, 81,800 kilowatt hours; Frannie division dragline, 4,100 kilowatt hours; United States shops, 2,630 kilowatt hours; commercial connections, 14,100 kilowatt hours; total, 102,630 kilowatt hours.

Farm work was delayed by the late season. Marketing of crops was the principal activity. The alfalfa hay on the project was mostly sold. The following carload shipments were made during the month: Alfalfa hay, 112; alfalfa meal, 5; potatoes, 55; wheat, 7; and cabbage, 3 cars. In the planning of this year's crops it appears that there will be a decrease of potato acreage and an increase in the sugar-beet acreage as compared with last year. Some acreage will also be planted to the Great Northern bean.—*J. S. Longwell.*

INDIAN PROJECTS, MONTANA.

BLACKFEET PROJECT.

March weather was about normal for the season. At the end of the month most of the snow was gone on the irrigable area with the prospect of an early spring. No construction work was done and little maintenance, although preparations were made to start on maintenance and a small amount of construction work early in April.

The field force consisted of three at the beginning and six at the end of the month. Office work consisted of the completion of the project history and operation and maintenance report for the season of 1922, some estimates in connection with the proposed enlargement of the Two Medicine Canal, and routine work in preparation for the coming season.—*R. M. Snell.*

FLATHEAD PROJECT.

March weather conditions were favorable. The early part of the month was cold, with considerable snow that increased the snow supply on the watersheds. The latter part of the month was warm and helped greatly to make roads passable. Frost was out of the ground and conditions were good for farming and construction work. Plowing was in full swing at the end of the month.

At Hubbard Dam hauling of cement and lumber was continued. At the end of the month better weather conditions had thawed out the gravel pit and dam site and made possible the resumption of placing concrete. Cutting of wood and trestle timber and sawing of wood by contract were in progress.

On the Tabor feed canal the steam shovel advanced, through exceptionally hard digging, 1,050 linear feet, to a point 150 feet from Falls Creek. The excavation for the month was 11,030 cubic yards, principally classes 2 and 3. Building of roads and clearing of roads and camp site were in progress preparatory to the large amount of structural work to be done this season. One hundred and sixty ricks of wood were sawed and split for steam-shovel fuel.

On the Ninepipe Reservoir enlargement repair of equipment and building of camp was started on the 20th. A camp will be built for the accommodation of 60 men and 100 head of horses. An elevating grader and 13 dump wagons were received from the Okanogan project. Placing of embankment in dikes was begun with 4-horse fresnos, using farmers and their stock. Forty-four head of horses were working at the end of the month. Elevating grader and dump

wagon work will start on the dam proper early in April.

Maintenance work on the irrigation system was limited to repair of camps and minor structures.

One survey party was in the field locating and cross-sectioning lateral systems on the Lower Jocko for early construction and setting cross-section stakes for the Ninepipe Dam enlargement and Tabor feed canal excavation.

There was some activity in leasing land and in organizing for cooperation with the Northern Pacific Railway in land settlement. A large number of bargains in improved farms had been listed with committees in each of the project towns.

Shipping of hay has been lively throughout the month at prices of \$15 per ton for alfalfa and \$17.50 per ton for timothy hay.—*C. J. Moody.*

FORT PECK PROJECT.

March weather continued cool. Cloudy days accompanied by cold winds tended to hold back the spring run-off. Owing to the very light precipitation, the soil in general was in need of moisture.

Field work consisted of a general patrol of canals and structures in connection with the run-off. There was not sufficient flow in the streams to materially affect the storage supply. Office work consisted of the revision and preparation of operation maps for the field forces.

The condition of winter wheat can not yet be determined. No field operations had been started by the farmers owing to frost conditions. Live stock generally were in fair condition and little loss was expected.—*E. L. Decker.*

GENERAL OFFICES.

Washington office.—Director Davis was in charge of the office the entire month except for one day attending a meeting of the United Engineering Society of New York. During his absence the office was in charge of Assistant Director Bien as acting director.

Chief Counsel Hamele was in the office the entire month.

Statistician Blanchard delivered a number of illustrated lectures on the work of the Service, including one at Yale University.

Purchases during the month amounted to \$6,984.25, and the value of the 256 requisitions filled and sales from the storehouse amounted to \$3,451.63.

Publications issued comprised 88 copies of the annual reports and 366 miscellaneous publications. The 31 mimeograph jobs amounted to a total run of 23,110 sheets.

The number of inquiries concerning the Service and opportunities for settlement answered by the settlement and information section amounted to 672. At the close of the month the total number of inquiries from ex-service men concerning opportunities on the land totaled 196,896.

The photographic laboratory turned out work during the month to the value of \$295.36, distributed as follows: Washington office, \$14; field, \$271.75; sales, \$9.60.

During the month 525 names were added to the Reclamation Record mailing list and 104 dropped, making a total mailing list of 16,836.

Denver office.—On March 1 the chief engineer was in Salt Lake City in connection with the secondary investigations being carried on in Utah, returning to the Denver office on March 2 from a two weeks' trip

in the field. He left Denver on March 10 for Las Vegas, Nev., to join the congressional party, consisting of Senators and Congressmen on the Irrigation and Appropriation Committees. He accompanied them from Black Canyon dam site to the Imperial Valley, Yuma project, and San Diego. He then returned to Las Vegas, where he met Consulting Engineers A. J. Wiley and L. C. Hill, Designing Engineer J. L. Savage, and Engineer James Munn, to consider, as a board, matters pertaining to the Boulder Canyon and Black Canyon investigations. Mr. Weymouth stopped in Salt Lake City again on March 24 and returned to Denver on the 25th. Assistant Chief Engineer R. F. Walter left Denver on March 25 for Salt Lake City, where he was joined by Designing Engineer J. L. Savage for a board meeting in connection with the Great Basin investigations. They left Salt Lake City on March 31. Engineer James Munn was on the Klamath project for a few days at the end of the month to confer with project officials in reference to the proposed Horsefly dam and Langell Valley irrigation.

The principal work in the designing section consisted of the following: Prepared design for reconstruction of town-site siphon No. 2, Belle Fourche project; continued work on details for drum gates; started detail drawings for overflow section of dam; completed schematic drawings and began making details for automatic operating equipment for drum gates, Boise project; completed detail design for siphon lateral 70.1-A; completed designs for Tabor feed canal above Falls Creek; completed detail designs of Falls Creek crossing and wasteway structures, Flathead project; checked for approval and issuance specifications and designs for structures, West canal, Langell division; checked for approval and issuance specifications and designs for head works at Lower Lost River diversion dam; prepared preliminary design for variable radius dam at Horsefly and made estimates for four heights of dam to get data for cost storage curve, Klamath project; prepared designs for various major structures, Fort Laramie Canal, North Platte project; partially prepared design for by-pass and wasteway at Pilot Butte power plant, Riverton project; partially prepared detail designs for 18 metal flumes carrying canals and laterals over proposed drains, Sun River project; completed design for Granger siphon, Yakima project; continued studies of types of dams for McKay Creek and collected and traced data accumulated in previous studies, Umatilla project.

The principal work in the electrical section consisted of the following: Work was continued on plans and designs for the Black Canyon pumping plant, Boise project; tracings of the details of the 30 by 42 inch gates for the Hubbard Dam were completed, Flathead project; location was made of the new penstock from Lahontan Dam to power house, Newlands project; studies were made for the economic location of the Pilot Butte power plant, Riverton project; advice was given the project manager regarding the proposed power contract with the Chicago, Burlington & Quincy Railroad Co. at Cody, Wyo., and in regard to the design of the Deaver-Cowley 4,000-volt transmission line, Shoshone project; assistance was given in the purchase of two 80-B Bucyrus electric shovels for the construction of the McKay Dam, Umatilla project; detail drawing of an 8-inch automatic air valve, to be used in connection with 5 by 6 foot high-pressure emergency gates, was prepared; computations for roof

trusses, beams, and other parts of the valve house were made; some work was done on the design of the 24-inch needle valves, Yakima storage project; preliminary estimates of the Provo Bay, Mosida, and Utah Lake pumping plants were prepared for the Salt Lake Basin secondary project, Utah.

Among the more important matters which received consideration in the legal department were: Acquisition of lands for McKay dam and reservoir site, Umatilla project; public notice and proposed letters to irrigation districts respecting operation and maintenance charges for season of 1923, North Platte project; payment of construction charges on irrigable land in town sites in Montana within boundaries of irrigation district No. 1, Lower Yellowstone project; equalization of operation and maintenance charges, Sunnyside division, Yakima project; delivery of water to lands on Belle Fourche project for season of 1923, notwithstanding delinquency in payment of prior charges; water rental application of Harlem irrigation district, season of 1923, Milk River project. The

more important forms of contracts considered, prepared, or transmitted, were: Draft of contract for sale of water to adverse appropriators on Shoshone project; contract with Denver & Rio Grande Railroad Co. for sale of electrical energy to company at Thistle, Utah, Strawberry Valley project; draft of proposed contract with the American Falls Reservoir district, Minidoka project; proposed contract for turning over Strawberry Valley project to water users.

An average of 408 letters per day was received in the mails and files section; the disbursing section handled 1,048 vouchers, involving an expenditure of \$267,802.21; in the purchasing section 417 advertisements were issued; 694 vouchers prepared, involving a net expenditure of \$194,919.16; 4,000 rates were furnished for basing purposes in awarding orders and making transfers, and 458 bills of lading were furnished for the movement of materials. The cost and property section handled transfers of material and equipment amounting to \$21,997.21.

THE JUNK PILE.

By Everybody.

AS most of our readers know, this column was started last month and we believe it's going to fill a long-felt want. As a starter in reactions, the editor sent a copy of last month's RECORD to his sister and she came back promptly with a letter to the effect that the RECORD seemed to be picking up, that the JUNK PILE had given several good laughs to her and her associates.

How many employees of the Newlands project remember the visit of former Secretary Garfield to the headquarters office at Fallon in 1907? The office was a one-story building with an attic. For days the employees had been going over the lower rooms with a toothbrush to make the place a model of cleanliness for the Secretary's visit. Everything apparently was in place and in apple-pie order. Everyone beamed with self-conscious approval when the Secretary arrived. However, Mr. Garfield spied a trapdoor in the ceiling and characteristically climbed on a table, raised the trap, and chinned himself into the opening. The whole attic was jammed with a mass of debris hurled up by the employees in their general clean-up below. Mr. Garfield dropped to the floor, grinned cheerfully, and said nothing. No remarks were needed. The ludicrous look of dismay on the faces of the employees was enough.

Perhaps you know this one. Before Andy Weiss became the efficient project manager he now is he taught engineering in a western university. Likewise he couldn't sling the English language in his present efficient manner, and had not acquired full power of discipline, so that the boys in his class frequently took advantage of him. One day capped the climax when several boys played euchre through-

out the lecture. Andy stood it as long as he could and then exploded with "My command of the English language will not permit me to express my contempt for those jackasses on the back row."

Do you remember John Field, former supervising engineer? Field was trying to get a right of way in connection with the Pathfinder Reservoir and the rancher he was interviewing was objecting because he didn't want to be drowned out. Field said, "I am reminded of a story about Pat Murphy. A water main near his place burst, flooded his chicken yard, and threatened to drown his flock. Pat hurried to the chief of police to complain and was promptly referred to the water department. This department happened to be in a humorous mood and shunted him along to the city attorney, who had been tipped off to the joke and sent Pat to the mayor. Pat was in the mayor's office a long time but came out beaming to find the outer office crowded with employees who had gathered to see his flying exit from the mayor's sanctum.

"Well, Pat," said one, 'how did you make out?'

"Fine," said Pat. 'The mayor says "Why in Sam Hill don't you raise ducks?"'"

Field got his right of way.

Guy Numbers, appointment clerk in the Washington office, hands out this one: "As a recuperative stimulant to employees on sick leave, pay day is far in the lead."

Come on, boys, keep her going.

The best soils on the farm should be selected for the alfalfa field. It is practically useless to attempt to grow the crop on nonproductive lands to improve them.

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St. Mary Storage Division.—R. M. Snell, project manager, Brown-ing, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Salt River Project.—Being operated by the Salt River Valley Water Users' Association; C. C. Cragin, general superintendent and chief engineer, Phoenix, Ariz.

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San Francisco, Calif.—P. W. Dent and Brooks Fullerton, district counsel, 349 Pacific Building. Projects: Salt River, Yuma, Oriand, and Newlands.

The Reclamation Record

Issued Monthly by the RECLAMATION SERVICE, DEPARTMENT OF THE INTERIOR, Washington, D. C.

VOLUME 14, No. 5

Price: 75 cents per year

MAY, 1923



UPPER: BREAKING THE SOD.

LOWER: THE FULFILLMENT.

"WHAT HAVE YOU DONE?"

ONE of the oft-recurring questions that is asked the Reclamation Service is, "What have you done?" This is frequently answered by referring to the statistics of construction results—so many thousands of miles of canals dug, so many hundred thousand cubic yards of material excavated, so many dams, flumes, bridges, etc., constructed, and scores of other like figures. Or the reply may be made from the standpoint of the water user to the effect that as a result of the work of the Reclamation Service crops to the value of so many millions of dollars have been grown on the projects, or the value of the raw land has been increased so many hundredfold, or the assessed valuations of the farms and town property have increased by so many per cent. Another viewpoint is that of the amount repaid by the settlers on the cost of construction; how well they are meeting their payments as they come due, and whether the service is financially solvent. All these answers to the question have their proper place, but wherever possible should be supplemented by statistics showing how efficiently and economically the work has been performed.

The Reclamation Service stands in the position of operating a trust fund in the interest of the settlers on the projects. The amount that is expended by the service in the construction of irrigation works must, under the law, be returned by the settlers enjoying the benefits accruing from such construction. There is therefore an especial incentive on the part of those to whom is intrusted the expenditure of these funds to perform the work with the highest degree of economy and efficiency of which they are capable. These have been the watchwords of the service from its inception.

Let us be more specific. Money tied up in stocks of materials and supplies is to a certain extent at least a frozen asset. If surplus stocks can be reduced or disposed of, more money is available for the work of construction. By constant attention to this one phase of the work, stocks of materials and supplies were reduced from \$1,951,000 to \$1,537,000 in 1921 and \$1,058,000 in 1922, a reduction of nearly one-half in two years.

In the work of the Reclamation Service, as in other lines of endeavor, human labor has had to give way to the machine. In many cases satisfactory machines for our work did not exist, but by having the manufacturers of excavating machinery, in particular, make changes in their machines in accordance with designs provided by the service, the cost of earthwork excavation has been reduced from 15 cents per yard to 12 cents per yard, or 20 per cent.

It used to be common practice to clean canals with the use of teams—an expensive and tedious process, although essential to the proper functioning of the canals. By using machines, notably the small dragline excavator and the Ruth dredger, the cost of this work has been reduced about 50 per cent. Both of these machines, although on the market for a number of years, have been improved greatly in efficiency and adaptability for our work through suggestions made by engineers of the service.

One of the methods by which a relatively small economy was effected was by disposing of part of the Government supply of horses and hiring teams from the water users when needed. As a result of this, the cost of caring for stock was reduced during 1922 from \$226,000 to \$108,000, or more than 50 per cent. Another advantage which resulted was that the farmers received considerable financial assistance by giving employment to their stock during idle periods.

Another method by which the service brought about an economy and also gave the farmers an opportunity to earn something with their stock and equipment, which otherwise would have been idle, was by contracting work, such as hauling sand, gravel, and cement in small amounts and by employing the settlers on small excavation jobs instead of making contracts with large concerns and letting them subcontract. This method of handling this class of work resulted in a reduction of the cost amounting to about 15 per cent.

During 1922 the overhead cost was reduced from \$931,000 to \$749,000. One of the methods employed to reduce the overhead was by giving efficient employees a little more compensation and arranging for them to take on additional work when resignations occurred, which also resulted in creating a better feeling among the employees.

Few of these economies could have been made without the full cooperation of the entire force. What this amounted to in the way of a saving to the farmers is indicated by the fact that for the items mentioned above the cost of operating and maintaining the irrigation systems providing water for the growing of crops on over 1,000,000 irrigated acres was reduced from \$2,792,000 to \$2,227,000, or from an average cost per acre irrigated of \$2.55 to \$2.12.

On the Rio Grande project upward of \$600,000 has been saved on 15,000,000 cubic yards of drain excavation by the use of Government-operated gasoline-driven dragline excavators. These efficient machines did the work at field costs ranging from 6½ to 9 cents per cubic yard, whereas the lowest bid received from a con-

tractor was 13½ cents. In this connection Mr. H. H. Brook, president of the Elephant Butte Water Users' Association, Rio Grande project, writes:

Our experience is that the Reclamation Service is able to do construction drainage work far cheaper than private contract. We have figures that the Reclamation Service has saved on this project between \$500,000 and \$600,000 in the movement of 15,000,000 yards under what it could have been done by private contractors let out as bids by a public corporation. In fact, we tested the matter very carefully. We found that the best private contract we could get was 13½ cents per yard, and we let one small contract at this rate. Later, the same private contractor would not accept another contract at less than 15 cents per yard. The average of all the Government work done in this valley is 8 cents or slightly under, which includes approximately 2 cents per yard for depreciation of the machines. I have just received this morning a statement of machine operations comparing the work on the various projects and briefly the result is this:

"Five machines on the Rio Grande project operated at an average cost of 8.3 cents per cubic yard. One machine operated at a cost of 6.2 cents per yard. The average on all the projects was 10 cents per yard, so that while our operations on the Rio Grande project have been cheaper than any of the other projects, nevertheless all of the Government work is remarkably low in this character of work."

On this same project, the Rio Grande, we are making repair parts for dragline machines in our own machine shop at savings up to and even beyond 50 per cent of the prices quoted by the manufacturers.

On the North Platte project, by the construction of a hydroelectric plant and the operation of electric-driven dragline machines by Government employees, a saving of \$543,000 has been made since 1918 on canal excavation. The field cost of our work has averaged 10.7 cents per cubic yard, whereas the last bid received was 21.3 cents.

At the present time a hydroelectric plant is being built on the Riverton project, Wyoming, to furnish current for dragline machines, which it is estimated will show a saving for the work in hand of \$137,000 over the use even of gasoline-driven Government-operated machines.

Under the system of the Reclamation Service of budgeting the amount available for each project to the individuals in charge of particular pieces of work, the responsibility for the financial status, as well as for the construction requirements, is fastened on the employee in direct charge of each job, and he is constantly on his mettle to complete the work within the allotment.

Cooperation with other bureaus in the utilization of surplus materials and equipment is constantly practiced. Here is an outstanding example: Over 2,000,000 pounds of T. N. T. and 750,000 pounds of black powder have been secured from the War Department surplus for our construction work at a cost of freight and handling, resulting in a large saving to the water users in the cost of these materials.

Under the law the function of the Reclamation Service is to invest the reclamation fund in the construc-

tion of projects which when completed begin to return their entire cost to the Federal Treasury, completing the payments in 10 to 20 years. The above record of efficiency, therefore, is hastening materially the completion of the projects with the funds available. This hastens by that much the time when the entire investment of the United States in any project is transformed from a "frozen credit" into an increasingly available asset.

LOWER CONSTRUCTION COSTS.

THE April issue of the RECLAMATION RECORD gave a comparison of costs relating to incidental operations of the service. The present article deals with some classes of construction work which are fairly comparable from year to year.

The following unit costs include overhead expense.

Item.	Unit of measure.	Calendar year.		
		1920	1921	1922
Concrete lining and plain concrete.	Cubic yard.	\$18.45	\$16.60	\$15.55
Reinforced concrete.	.....do.....	44.70	30.40	26.70
Canal and drain excavation by machine.	.....do.....	.145	.15	.12
Canal and lateral excavation by teams.	.....do.....	.37	.24	.21

Construction costs are subject to sudden changes more than nearly any other class of work, owing principally to labor and market conditions. During periods of high wages caused by labor shortage it is impossible to get the same production. Labor turnover is greater and is less efficient. Manufacturers have plenty of orders and are not so anxious to bid close in order to secure business.

This situation requires close cooperation between the field forces and the central control offices to secure the best results. The central offices are in a better position to provide engineers and foremen with experience to take charge, are in closer touch with the labor conditions and can control the local wage scale, are informed as to the condition of the market for materials needed, and have an organization trained in laying out and directing the work in the most economical manner.

During high labor costs it was found that it would be impossible to continue construction work by man and team methods and keep costs anywhere within a reasonable figure. The standard stock excavating machines manufactured by the leaders in these lines were not giving satisfactory results, so the service detailed some of its best engineers to the task of developing, in cooperation with the manufacturers of drag-line machinery, a machine that could be more easily moved and that would use gasoline or oil in place of coal, which latter was expensive. They also redesigned certain parts that were continually breaking, causing expensive delays.

This resulted in securing two types of machine in particular that moved earth at a field cost about one-half that of man and team methods, as shown above in the comparison of unit costs between excavation by machine and by teams.

The reduction in concrete work, both plain and reinforced, from 1920 to 1921 was due in part to lower costs for cement and reinforcement steel, but the

greater part of the reduction in 1921 and 1922 was due to securing small contractors to haul cement, sand, and gravel on a yardage basis rather than on a daily basis, and also by the standardization of structures and methods. This standardization cut the cost in form building and increased the efficiency of the employees, owing to their familiarity with the work to be done.

THE RIO GRANDE PROJECT. NEW MEXICO-TEXAS.¹

By D. W. Davis, Special Assistant Secretary of the Interior.

THE Rio Grande project, by reason of its important and complex international and interstate features, occupies a position somewhat unique in reclamation work. Its completion was a notable event in the history of the Southwest. It brought to a close a protracted period of strife and contention between the citizens of neighboring States and made possible an amicable adjustment of a controversy nearly half a century old between two Republics.

Our rigid observation during the past 10 years of the solemn covenant between the United States and Mexico, apportioning the stored waters of the Rio Grande, is irrefutable proof of our friendship and just dealing toward our neighbor on the south. When a full and frank understanding has been reached between Mexico and the United States, I am confident that the conduct of our people in this matter will render it easy to conclude negotiations which will result in other large enterprises of international importance in the lower valley and in the Colorado River delta.

The full utilization of the waters of the Rio Grande from its sources in Colorado to the Gulf presents engineering problems second only to those now receiving the consideration of our Federal forces on the Colorado and the Columbia. Their successful solution depends in part upon a restoration of comity with Mexico, which country will be a large beneficiary from this work of reclamation.

Our imagination is thrilled when we contemplate a picture of the Rio Grande from Colorado on the north to the Gulf on the south, with all of its level valleys dotted with prosperous farmsteads. When the great work has been accomplished, what will be El Paso's place in the Southwest?

We have here to-day a splendid city, whose growth has been phenomenal, notwithstanding the fact that its greatest resource until recently has been neglected. I speak of your project lands, in the reclamation of which the Government has spent millions. Progress in the past has been dependent almost wholly upon commercial and manufacturing indus-

tries supplying markets more or less remote and the location of large military forces at your doors. Important as these are to the welfare of the community, you are only just awakening to a realization that a far more stable, certain, and permanent source of wealth and prosperity is to be found in the thousands of fertile acres all about you. From these acres once in cultivation the annual returns will exceed each year the value of all the manufactured products of smelter, mill, and factory.

I am greatly pleased to learn of your plans to initiate a broad campaign of publicity in order that the world may know of the resources of this valley. The Department of the Interior has made a large investment here, the repayment of which can be assured only by putting the reclaimed lands into profitable use. Your efforts to secure practical farmers will have the hearty cooperation of the department, providing proper safeguards are thrown around the settlers to prevent exploitation. The advantages of climate, fertile soil, diversified products, and excellent markets which the valley possesses have only to be made public to make it a Mecca for homeseekers, providing prices of land are maintained at fair levels.

Hunger for land has not ceased, but the land-seekers are wary. The success of your publicity work depends upon square dealing and fair prices. During the past 10 years most colonization efforts have failed because land prices have been unduly inflated and the settlers have not received fair treatment.

A greater degree of prosperity is coming to El Paso than ever before enjoyed when her citizens grow what they eat on the lands about the city and cease to purchase it from distant markets, as is now the case. Millions annually are spent for products from other States which can be grown more cheaply right at home. The annual returns from the farms on this project, if all the land were in proper cultivation, should exceed \$15,000,000, and until this level has been reached it can not be said that your people have acquired the full fruition of their opportunity.

¹ Extracts from speech at El Paso, Tex., April 20, 1923.

ECONOMIES OF POWER DEVELOPMENT, NORTH PLATTE PROJECT, NEBRASKA-WYOMING.

By J. M. Gaylord, Electrical Engineer, Reclamation Service.

THE Fort Laramie division of the North Platte project covers an area of 107,000 acres of land lying on the south side of the North Platte River, partly in Wyoming and partly in Nebraska. The construction of this unit involved the building of a main canal about 130 miles long and the excavation of 15,000,000 cubic yards of material. The construction of the irrigation system was undertaken in 1915 and carried on by contract until the fall of 1917. During this period 7,550,000 cubic yards of material were excavated, at an average field cost of 17 cents per cubic yard. In 1917 it became increasingly difficult to make further contracts, and the best bid received December 17, 1917, was 21.3 cents per cubic yard. This price was considered so high that consideration was given to developing power and doing the work with electric drag-line excavators operated by Government forces. It was estimated that by this means the cost could be reduced to 15 cents per cubic yard. As a matter of fact, the cost has actually been reduced to 10.7 cents per cubic yard, which means a total saving of \$543,000 up to October 1, 1922, over the price bid December 17, 1917.

The main Fort Laramie Canal is built along the bluffs close to the river for 30 miles or more below the diversion dam at Whalen, and at mile 25.5 a favorable site was found for the development of power by dropping the water back into the North Platte River under a gross head of 110 feet. This site is about 3 miles from the town of Lingle, from which the plant takes its name. The Lingle power plant contains two horizontal generating units, each consisting of a 450-horsepower Trump hydraulic turbine direct connected to a 375-kva. Allis-Chalmers generator with exciter mounted on the same shaft. The units operate at 600 revolutions per minute and deliver 2,300-volt current to the bus bars. Each turbine is equipped with a synchronous valve and a heavy flywheel to improve speed regulation under the extremely variable drag-line load. A voltage regulator is provided for maintaining constant voltage, and a water rheostat to steady the operation of the system under light loads is a part of the permanent equipment of the plant. Water is diverted from the main Fort Laramie Canal into a short stub canal leading to a concrete forebay which is provided with trash racks and headgate for the penstock. The penstock is of wood-stave construction, 54 inches in diameter and 835 feet long. It terminates in a steel manifold, to which the turbines are connected through gate valves. Provision is made for extension of the plant and the installation of a third unit of the same

capacity as the two now installed. The tailrace is lined with concrete for a short distance below the plant and a shallow canal has been excavated across the river bottom to the main river channel, several hundred yards away. The foundations of the power house are of reinforced concrete, but the superstructure is of wood-frame construction covered with corrugated iron and plastered on the inside. Power is generated at 2,300 volts and stepped up through transformers to the transmission voltage of 33,000. The total cost of the power plant was \$98,998.50.

The 33,000-volt transmission line extends from the power plant throughout the entire length of the Fort Laramie division, with branches extending northward across the river to the towns of Torrington, Mitchell, and Morrill, which obtain surplus power for municipal purposes from the Government power system. The permanent portion of the transmission line is constructed of 35-foot poles with 7-inch tops, spaced 250 feet apart, and carries a single circuit of No. 6 B. & S. copper. Temporary branch lines and some of the branches for supplying commercial power are built of 35-foot poles with 6-inch tops, and carry No. 6 B. W. G. iron conductors.

Portable substations are provided to receive power at 33,000 volts at the transmission lines and to step it down to 4,000 for transmission over temporary lines to the dragline excavators. Each of these substations has a capacity of 225 kilowatts and is sufficient to supply two excavators. The substations are moved from one central point to another as the work progresses. Each portable substation is equipped with a 33,000-volt fused pole-top switch and an outdoor multigap lightning arrester. On the secondary side there are two 4,000-volt switchboard panels, each equipped with a switch and meters for the control of a single 3-phase circuit. The 4,000-volt secondary lines are of No. 4 B. & S. copper, and the construction of these circuits is as simple as possible, consistent with reliable operation for the short periods these lines are in service. It is found that with this size of copper one class 9½ dragline, requiring a momentary maximum of 125 to 150 kilowatts, will operate satisfactorily up to about 8 to 10 miles from the substation.

Each of the dragline excavators is equipped with two motors operating at 440 volts, and on the newer machines the transformers for stepping the voltage down from 4,000 to 440 volts are located on the revolving platform. Power is led into the machine through a flexible three-conductor cable which connects with brushes, making contact with the revolving collector rings on the excavator. The average cost of the per-

manent transmission lines was \$1,375 per mile; the temporary iron lines cost about \$1,000 per mile. The 4,000-volt temporary lines have cost approximately \$1,300 per mile, and the portable substations about \$5,000 each. These costs include general expense.

Excavation work was started in May, 1919, and up to October 1, 1922, 5,123,709 cubic yards of material, of which 16 per cent was class 2, had been moved. The field cost per cubic yard was as follows:

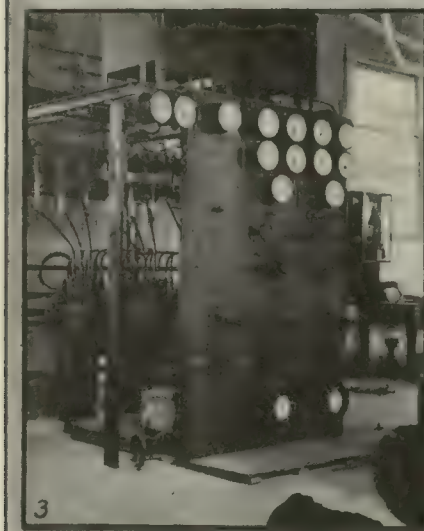
	Cents.
Machine operation.....	9.85
Drilling and blasting.....	.78
Plowing and miscellaneous.....	.08
Total.....	10.71
Estimated cost, 1917.....	15.61
Bid price, December, 1917.....	21.3

The total field cost was \$549,572.53, which is about \$250,000 less than the estimate of 1917 and \$543,000 less than the cost would have been at the unit price bid in December, 1917. The report of excavating machine operation for the main canal, stations 4902

to 5634, for the calendar year 1922 gives a very good idea of the items entering into the field cost. The material excavated amounted to 492,120 cubic yards, of which 72 per cent was class 1 and 28 per cent class 2.

The field cost per cubic yard was as follows:

	Cents.
Labor, machine crew.....	1.59
Power.....	.76
Power maintenance of temporary transmission lines.....	.03
Lubricants.....	.06
Wire rope.....	.22
Transportation of crew.....	.17
Depreciation of power plants.....	.45
Depreciation temporary lines and substations.....	2.15
Camp operation and maintenance.....	.06
Minor repairs to equipment and miscellaneous supplies.....	1.46
Minor miscellaneous expenses.....	.04
Plant charge.....	.50
Equipment charge.....	2.01
Total.....	9.50



NORTH PLATTE PROJECT, WYOMING-NEBRASKA.

1. TEMPORARY SUB-STATION.

2. LINGLE POWER PLANT.

3. SWITCHBOARD IN LINGLE POWER PLANT.

4. GENERATING UNIT, LINGLE POWER PLANT.

The cost of the construction plant for this work, including, as it does, the power plant, high and low tension transmission lines, substations, etc., is necessarily high. The total investment was over \$500,000. This investment is being charged into the cost of excavation on a yardage basis, and the total of all depreciation items in the above cost amounts to 5.5 cents per cubic yard. The cost of power, including operating expense, construction, maintenance, moving of temporary lines, and depreciation items, amounted to 3.68 cents per cubic yard. The amount of energy used per cubic yard excavated has averaged 0.53 kilowatt hour, measured at the portable substations.

Before the Lingle power plant had been completed the town of Torrington started negotiations for the purchase of surplus power for distribution by the municipal light and power system. A standard rate schedule was worked out and contracts have been made with six towns on the project. The standard rate is as follows:

	Cents per kilowatt hour.
For the first 20 hours use of the maximum demand	8
For the next 20 hours use of the maximum demand	6
For the next 40 hours use of the maximum demand	4
For the next 40 hours use of the maximum demand	3
For the next 120 hours use of the maximum demand	2
Balance of power used	1

Discounts are allowed, varying from 1 to 10 per cent according to the customer's maximum demand, the 10 per cent discount applying to installations of 100 kilowatts and over. These rates apply to power delivered at 2,200 volts, and an additional discount of 10 per cent is allowed if power is delivered and metered to the customer at the transmission-line voltage of 33,000, or 8 per cent if delivered at 33,000 volts and metered at lower voltage.

The gross income from the sale of surplus power for the calendar year 1922 was as follows:

Torrington	\$10, 124. 79
Lingle	1, 728. 32
Morrill	4, 086. 00
Mitchell	10, 927. 94
Yoder	654. 38
Total	27, 521. 43

The total amount of energy sold was 898,140 kilowatt-hours, and the average gross return per kilowatt-hour was 3.1 cents. The total gross income to January 1, 1923, was \$69,189.07. In addition to the power used by the excavators and sold to the project towns, a considerable amount has been used for drainage pumping in the Dutch Flats district. An investment of about \$21,000 was necessary to connect up the commercial load and the Dutch Flats wells. The use

of power for commercial purposes and project operation has increased the output of plant and reduced the cost per kilowatt-hour. The net income goes to reduce the cost of the project and it is estimated that the project has been benefited to the extent of \$30,000 or more by the commercial power operations in addition to the reduction in cost of the excavation work. After the completion of the construction work the plant will no doubt be maintained for the purpose of furnishing commercial power and other power needed in the operation of the project. It is also probable that a considerable amount of power will be furnished from this plant for the construction of the Guernsey Dam. Additional power development is planned at Guernsey, and after the completion of this dam the two power plants will no doubt be operated together to supply the commercial and other demands of the project. The original investment in the power plant and permanent transmission lines amounted to about \$186,000, and depreciation is being charged off to construction and other work at a rate which will leave about \$105,000 in this account upon the completion of the 7,000,000 yards of excavation work on the Fort Laramie division.

The results of power development have exceeded expectations, both as to the cost of excavation work and the commercial power earnings. The saving in the cost of construction work will undoubtedly exceed \$700,000 at the completion of the work. The sale of surplus power has produced a gross income of over \$70,000. A commercial power business has been established which will undoubtedly grow and make the power system more than self-sustaining when the completion of the construction program releases additional power for sale. The fact that power is available makes the project a better place to live.

The satisfactory results are not due alone to the natural advantages of the project, but to these resources controlled and directed by the driving efficiency of L. G. Cairns, superintendent of construction; the sagacity of W. H. Bashore, assistant project manager; and the wise supervision of Project Manager Weiss.

Reclamation Service Sums Up Work.

The Reclamation Service of the Interior Department has completed a summation of its work conducted since the reclamation act went into effect 20 years ago. The summation shows that operations of the department in irrigating arid lands have reached great proportions.

The water-storage capacity of irrigation project reservoirs of the Department of the Interior in Western States has now reached 10,000,000 acre-feet, or enough to cover the entire State of Connecticut with 3 feet of water.

The number of projects now under way or completed embrace upward of 3,000,000 acres of land that may ultimately be irrigated and divided into 70,000 farms, ranging from 10 to 160 acres. Water is already available for over 2,000,000 acres on more than 44,000 farms.

The construction of irrigation projects has included over 12,500 miles of canals, ditches, and drains; tunnels, with an aggregate length of over 27 miles; masonry, earth, rock-fill, and crib dams, with a total volume of 14,000,000 cubic yards; over 8,000 bridges; 560 miles of pipe line; 130 miles of flumes; 1,000 miles of wagon road; 83 miles of rail-

road; 3,000 miles of telephone lines; 970 miles of transmission lines; and 1,450 buildings, such as offices, residences, power plants, pumping stations, barns, and storehouses. The excavation of rock and earth amounts to about 200,000,000 cubic yards, equivalent to an excavation 1 mile on a side and nearly 200 feet deep. Excavation during 1922 exceeded 1,000,000 cubic yards a month.

The Reclamation Service has used over 3,000,000 barrels of cement and has manufactured over 1,500,000 barrels of cement and sand-cement. It has mined 140,000 tons of coal. The irrigation works incidentally develop approximately 64,000 horsepower.

ECONOMIC ADVANTAGES OF CONCRETE LINING OF CANALS AND LATERALS ON THE ORLAND PROJECT, CALIFORNIA.

By R. C. E. Weber, Project Manager.

AT the conclusion of work of placing concrete lining for the season of 1922-23, there had been placed 755,400 square yards of lining on 79.8 miles of the canals and laterals comprising the distribution system of the Orland project. The first work performed during 1911 in this connection consisted of lining several high fills on the High Line Canal and various sections, also in fill, of laterals located in fertile black sandy loam, where plant growth was so luxuriant as to require cleaning several times during the irrigation season in order to permit regular water deliveries. The work first performed was limited in extent, but was followed by expenditures from revenues of the original construction charge of the project, which provided for lining about 30 miles of distributary channels. The results of the lining thus placed were so satisfactory that, with the realization of inevitable high maintenance costs unless a comprehensive program of lining was adopted, the Orland water users in 1917 entered into a supplemental agreement with the Secretary of the Interior, agreeing to an increased building charge of \$11 per acre to be expended in placing concrete lining. Construction under this supplement agreement was subsequently commenced and has since been prosecuted each winter season, the work being performed after the close of the irrigation season in the fall and prior to its beginning in the spring. There still remain unexpended from the supplemental revenue sufficient funds for lining 10 miles of laterals, so that at the conclusion of the supplemental work 90 of the 148 miles, or 60 per cent, of the project distribution system will be lined with concrete.

Comparative costs of maintaining the earth and concrete-lined sections are available covering a season's work of cleaning 66 miles of the former and

31 miles of the latter, from which is obtained a cost of \$55.70 per mile for earth and \$19.50 for concrete-lined sections. The data apply to laterals of an average capacity of 25 second-feet. A reduction of 65 per cent in the maintenance cost of earth laterals results from the use of concrete lining, and this may reasonably be expected to increase as the system is more and more comprehensively lined. The work of cleaning earth sections is performed with teams and scrapers and consists in the removal of silt deposits and all plant growth. The maintenance work in connection with lined sections consists of the removal by hand of the small silt deposits and of making minor repairs to the lining.

A reduction in seepage and evaporation losses is an additional factor in favor of the concrete-lined section. By means of current-meter measurements and discharges over weirs, seepage and evaporation losses of laterals located in the different soil types of the project and in concrete-lined sections have been determined during each irrigation season from 1912 to 1922, the means of which are tabulated as follows:

Type of section.	Loss in feet per day of unit of wetted perimeter.
Concrete lining.....	0.29
Clay.....	.63
Gravelly clay.....	1.38
Loam.....	1.40
Gravelly loam.....	1.47
Sand and gravel.....	2.85

From the foregoing tabulation a material reduction in seepage and evaporation losses (as much as 90 per cent in sand and gravel sections) is possible by the application of concrete lining to the earth

section. Another important factor in favor of the concrete-lined section over the unlined channel in earth is that of the increased degree of operating safety as a result of the comparative freedom from washouts and breaks, with the consequent expense for repairs and possible great crop loss resulting from an interruption to regular water deliveries.

The irrigable area of the project is 20,500 acres, of which 15,000 acres were under irrigation during the season of 1922 and which was all served, either directly or indirectly, through concrete-lined channels. With the exception of about 4,000 linear feet of the South Canal (which it is deemed impractical to line on account of winter ground-water conditions), all the canals on the project distribution system, together with all laterals of capacity in excess of 25 second-feet, have been concrete lined. There remain unlined, therefore, only laterals of less than 25 second-feet capacity, and these consist mainly of secondary laterals or constitute the extremities of primary laterals where water is delivered only intermittently on the regular rotation periods.

The cost for all concrete lining placed on the distribution system of the project is 38.9 cents per square yard for 755,400 square yards placed on 79.8 miles of canals and laterals with capacities varying from 10 to 225 second-feet. The period of time over which this cost was incurred extends from 1911 to 1923, during which there has been a large variation in price of materials and wages of labor, as illustrated

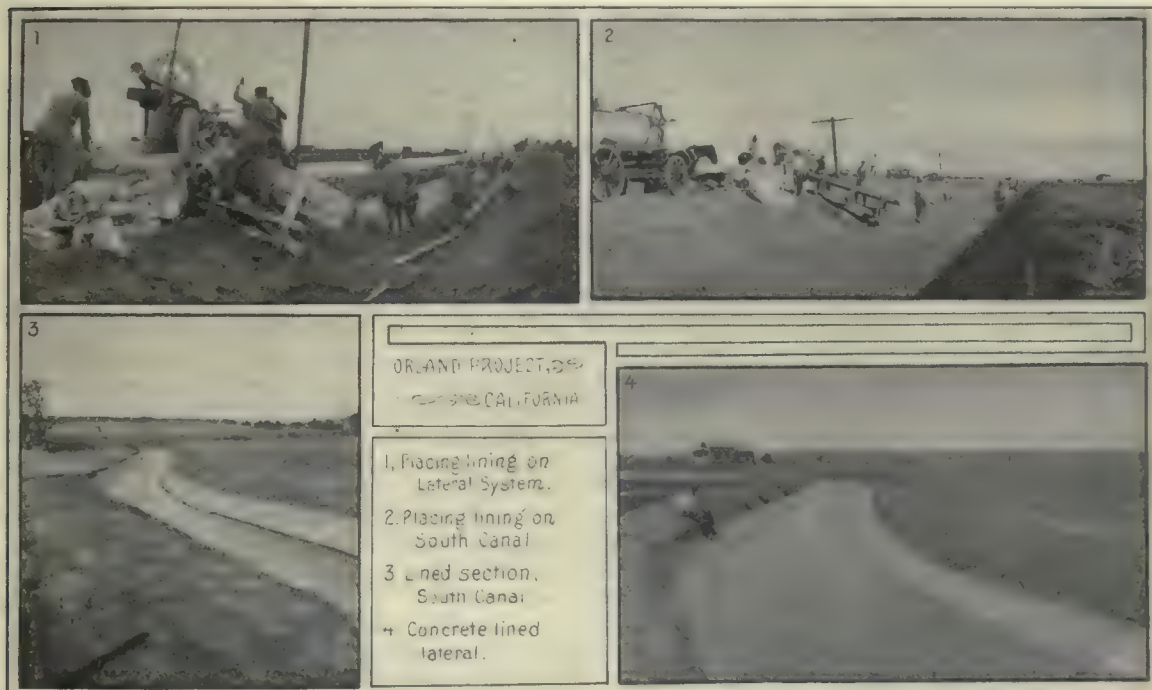
by the maximum of \$4 per day of eight hours for labor in 1920 to a minimum of \$2.24 in 1911.

Cost of concrete lining placed during season of 1922-23, Orland project.

Item of cost.	Total cost.	Cost per square yard.
Preparing section for lining.....	\$5,914	\$0.076
Cement (including hauling to field).....	10,129	.130
Gravel.....	3,921	.050
Mixing.....	1,944	.025
Placing.....	3,253	.042
Finishing.....	414	.005
Sprinkling and protecting.....	130	.002
Water.....	327	.004
Repairs and supplies.....	277	.003
Equipment charge.....	365	.006
Total labor and material cost.....	26,674	.342
Superintendence.....	177	.002
Engineering.....	509	.007
General expense.....	3,498	.044
Total overhead cost.....	4,184	.053
Total cost.....	30,858	.395

QUANTITIES

Item.	Unit.	Quantity.	Cost per unit.
Lining.....	Square yard.	77,919	\$1.395
Concrete.....	Cubic yard..	2,882.7	10.70
Lateral lined.....	Mile.....	9.05	3,410
Do.....	Linear foot..	47,776	11.695



Thickness of lining, 1½ inches.
 Average haul: Gravel, 1½ miles; cement, 4½ miles.
 Labor costs per day: Finishers, \$4.75; placers, \$4; laborers, \$3 to \$3.50; teamsters with 2 horses, \$5.50.
 Cement (at project warehouse), \$2.80 per barrel.
 Sections lined: Bottom width, 3 to 15 feet; vertical height, 1.5 to 4.75 feet; side slopes, 1½ to 1 and 2 to 1; capacity, 15 to 75 second-feet.

With labor and material prices as those prevailing prior to 1916, concrete lining has been placed at a cost of 34.3 cents per square yard, 27.8 cents of which was for labor and material and 6.5 cents for overhead charges, consisting of general expense, engineering, and superintendence. The average labor wage for lining placed at the foregoing cost was \$2.50 per day for laborers and \$4.50 for teamsters with two-horse teams. Cement cost was \$2 per barrel.

As there is little hope to be entertained that prices in the near future for labor and materials will approach the foregoing low figures, the detailed analysis above is submitted for the cost of lining placed during the season of 1922-23 with a view of illustrating probable costs for future work of this nature.

With regard to the durability of lining of 1½-inch thickness without reinforcement it can be said that lining placed in 1911 and in continuous use each irrigation season since is still in excellent condition, with no indications of disintegration or failure. The mild California winters in the Orland vicinity, where temperatures reach only a minimum of 21° above zero, make possible the use of an extremely thin slab of concrete for lining purposes.

DEVELOPMENT OF DAIRYING ON THE MINIDOKA PROJECT, IDAHO.

By Barry Dibble, Project Manager.

REDUCTION in the price of field crops since the fall of 1920 has turned the attention of farmers in southern Idaho to the possibilities of dairying as a stabilizer of farm finance.

Idaho, in common with other Western States, faces—and probably must continue to face—the disadvantage of paying high freight rates on products that move to eastern consuming markets. In 1919 the Minidoka project shipped 3,500 cars of alfalfa hay. It is obvious that if this hay can be converted into a condensed food product at home the same value can be shipped in a comparatively few cars at greatly reduced expense. Information compiled in 1910 showed that Idaho at that time was not producing enough butter to supply its own requirements. With the continued growth of population on the Pacific coast, an excellent market is developing there for dairy products.

During 1922 the State administration of Idaho led by D. W. Davis, then Governor of Idaho, now Special Assistant Secretary of the Interior, devoted much time and energy to the dissemination of information regarding dairying. Governor Davis personally participated in the dairy excursion across the width of the State, which included men of national prominence as experts in various branches of the business. One of the men who made the trip and examined into the possibilities of southern Idaho was J. L. Kraft, of the J. L. Kraft Bros., large Chicago dealers in cheese. Mr. Kraft many times on this trip expressed astonishment at the possibilities of Idaho for cheese production. Before leaving the State in September, 1922, he announced that he was prepared to interest cheese manufacturers in Idaho, and that he would pay Plymouth, Wis., board prices for Idaho cheese.

It is understood that Mr. Kraft in making this offer is planning to ship to the West instead of to the East. Mr. Kraft has sent several cheese men to Idaho, and H. F. Laabs, from Wisconsin, has established himself on the Minidoka project and in the surrounding territory. Laabs already has two cheese factories on the Minidoka project, one at Rupert and one at Paul. Before establishing a factory he requires that there be pledged the product of 300 cows. In less than a month after the Rupert factory opened the supply of milk reached the capacity of the plant, and it was necessary to send for additional equipment. Both factories are now running at full capacity. Sufficient pledges have been secured to assure the installation of factories at Burley and Declo, and Mr. Laabs has promised that these will be in operation about June 1, 1923. For several years a cheese factory started by cooperative effort has been running at Acequia, and its influence is gradually changing one of the most sandy and discouraging sections of the Minidoka project into a substantial and prosperous community.

A very noticeable effect of the establishment of cheese factories at Rupert and Paul was in the advance of the price of butter fat offered by local cream-receiving stations. This has amounted to from 6 to 10 cents a pound in the face of a declining market. The farmers are allowed to take back their share of the whey left from the milk. Ordinarily there is sufficient to allow each farmer that desires the whey enough to fill his cans. This whey makes excellent food for pigs.

The Minidoka project for a long while has had a very considerable number of dairy cattle. The annual crop report gives the following figures.

Dairy cattle on the Minidoka project.

Year.	Gravity division.	Pumping division.	Total.
1915.....	4,451	2,508	6,959
1916.....	4,638	2,676	7,314
1917.....	4,077	2,257	6,334
1918.....	3,409	2,785	6,174
1919.....	3,891	2,654	6,545
1920.....	3,792	2,582	6,374
1921.....	4,140	2,639	6,779
1922.....	4,383	2,846	7,229

Prior to 1917 the dairy industry was rapidly developing, but with the increasing price of field crops, it suffered a marked decline, from which it is just now recovering. The above figures include young

stock and all cows that are being milked. Some of these cows are not of the dairy type, and some of them certainly are not making money for their owners. A gradual elimination of the "boarder" cows will do much to aid in establishing the industry on a permanent basis on the project. An encouraging sign is the coming of a few men from Wisconsin and other dairy States who know the dairy business and who realize the advantages that Idaho offers to the real dairyman. It has been an interesting feature of the meetings to discuss the cheese factories, that the men who have cows are very rarely numbered among those who have had to make application for relief or who are in arrears in their payments to the Reclamation Service.

PRACTICAL SUGGESTIONS FOR POULTRY FARMERS.

By H. O. Numbers, Secretary Pennsylvania Poultry Association, Loretto, Pa.

IN this article we aim to address the nonproducers of poultry and poultry products. There is no good reason why a flock of poultry should not be included with the live stock of every farm. Just why so many farmers have not awakened to the possibilities of a "farm flock" has not been explained. One solution is "downright poor management." Mr. Farmer, you may be making money on your crops, but you are not doing your full duty from a financial standpoint, as well as from a patriotic point of view. Let me explain: The average farm can support a minimum flock of 100 hens on the by-products that have no other commercial outlet.

If you have cattle, you will have milk to feed your hens. If you make cheese from your skimmed milk, the whey from the curds can not be excelled for use in a moist mash.

One of the largest manufacturers of commercial feeds in the United States uses as one of his best selling arguments "that the alfalfa used in their chicken feeds is raised in the irrigated West." The claim is that this quality of alfalfa is superior to all others because of its soft juicy composition, which especially renders it suitable for poultry and dairy feeds. This is a fact, as we have tested the quality. With this superior chicken feed available on your own farms, you should set a pace for the poultry farmers in the United States. Alfalfa meal is an important constituent in all feed formulas.

During the open season your hens should be on free range, and they will subsist themselves. During the winter they should be comfortably housed, and as farm work is usually light at this season you will have ample time to feed and care for them.

Most farmers do their own "butchering." An investment in an inexpensive bone mill will return

many times the money you spend. Grind up all the refuse bone and meat and feed to your chickens.

Boil your little potatoes or other cast-off vegetables, and mix in some of your alfalfa that would go to waste. In the East many farmers during the winter gather all the hayseed from the barn and mix with boiled potatoes or vegetables.

Financially, a flock of 100 hens will return \$500 annually if properly handled. The only expense you have will be your labor. Of course, if you would rather loaf all winter than earn some easy money, continue in your same old rut, and grumble because you are not succeeding. I do not wish to convey the thought that anyone who does not farm chickens is not a success. But I do mean to drive this thought home, that the average farmer can readily make use of a clean net profit annually of \$500.

With our present parcel-post system and rural deliveries, no excuse can be made for not being able to market your produce. Recently one of our enterprising eastern cities made a survey among private homes to ascertain their preference as to "which way they would rather buy their eggs, from the producer or from a dealer"; 82.7 per cent decidedly said "they would rather buy from the producer direct, if such were possible." A small news ad in a city paper will bring you more customers than you can handle. It has been tried out.

On the other hand, consider your patriotic duty as an American. Are you so selfish as to think only of your own requirements? Do you want the people who are less fortunate than you, and who must depend on the American farmer for their eggs, to buy imported egg? You probably have a few scrubby mongrels running around your farm, *for your own use*. Every farmer will be expected to produce the limit,

and every farmer must use up his "waste," if America is to be fed with American products.

The reason people do not eat more eggs is because they do not have them. The American Poultry Association proposes a plan this year to have a publicity campaign, to advise the public to "eat more eggs." If everyone "lies down on the job" like you, Mr. Nonproducer, we may as well not spend any money in advertising.

Digestibility, food values, and calories are all in favor of eggs. The only reason the American public

is spending annually about 33 per cent of its "table fund money" for meat products is because the packers have advertised, and they keep advertising. Yet the amount of money spent for eggs from the "table fund" is only about 8 per cent. Eggs are in the minority, chiefly because of lack of production.

Sometimes it is necessary to get a man "mad" to rouse him to a full realization of his responsibility. I hope I have accomplished my purpose. Again, I repeat, you must produce if you would aid your country, as well as boost your annual profits.

SHORT STORIES OF SUCCESSFUL SETTLERS.

By C. J. Blanchard, Statistician.

AS springtime merges into summer we observe a far more cheerful tone in our correspondence with the farmers and the project folks. Looks now as if the waiting period had passed and a real turn to optimism had come. On the Uncompahgre project, which was mighty hard hit by shortage of cars, the chambers of commerce have begun a campaign to interest more farmers in their productive valley. On the Grand Valley a similar turn has taken place. Over in Idaho, on the Minidoka, where we heard the most dreadful tales of war and where conditions indeed were hard, there is a cheerful songster on the Rupert News who is pushing "dem clouds away." Listen to this song from the "Electric project."

Day by day in every way the people of this community are realizing more and more the wonderful future in store for Rupert and Minidoka County.

During the writer's six years in Rupert there has never been a time when the future looked so bright, when opportunities before us were so promising as they are to day. Sincerely and earnestly, we believe the future holds more for the people of this county to-day than ever before. And we are to enter that future immediately.

All indications point to bumper crops. The heavy rain of last week meant thousands of extra dollars to the farmers in production, and indications are that prices for farm produce will be much higher than during the past year.

Farming here this season will be the best it ever has been. The soil will be in better condition, crops will be more diversified and more attention will be paid to farm work, as each and every tiller of the soil in this county this year intends to go into the game for all it's worth.

Sugar beets show every indication of bringing a better price than last year, and the acreage will be heavy. Potatoes can't be lower, and those who know market conditions say the wise farmer will put in 5 or 10 acres this year. Indications point to an in-

creased number of sheep to be fed here next year, and with the large number of dairy cows sure to come a market will be had for all alfalfa grown. Corn is going to be a good crop, and in our opinion this year will demonstrate the fact that this is a first-class corn country. A larger acreage will be planted this year than ever before, and the most of it will be fed to hogs, sheep, and cattle raised in this county.

The dairy business is constantly growing, and before six months go by Minidoka County will have 300 more cows than she has at present.

"Reports from many of the reclamation projects of the Government indicate that the dairy cow is proving a most important factor in the restoration of normal conditions," stated Secretary of the Interior Work recently. In discussing the matter further, he said:

Bankers and loan companies are making liberal loans to organizations of farmers for the purchase of grade and registered dairy stock. Scrub stock is being sold for beef and money-making milkers are finding succulent pasture on these projects. Cooperative creameries, cheese factories, and condensaries are furnishing a market for the milk and butter fat.

The expansion of this important industry confirms the repeated statement that national irrigation is not a local question. The irrigation farmer is coming to the breeders of high-class Jersey and Holstein stock for his heifers and bulls. Wisconsin, Minnesota, Iowa, Kansas, and even Pennsylvania breeders are being called upon for stock. In the genial and sunny climate of the West the scions of prize-winning strains will find most favorable conditions for achieving new records in milk production.

Notes from Here and There.

Salt River project, Arizona.—The Maricopa County Cow Testing Association is actively promoting the dairy industry of the county by maintaining a careful record of the production of the milch cows by encouraging the disposal of scrub stock and the purchase of pure bred.

The Salt River Valley Water Users' Association, in cooperation with the service, is now circulating five prints of the motion-film scenario entitled "Arizona's Garden of Allah." One of these prints will be on the Texas circuit the greater part of the spring and summer. Another is booked for distant Oregon. The most favorable comment is received from the organizations showing these reels. A New Jersey pastor writes: "Your Garden of Allah pictures thrilled our church audience and made us all better Americans. We are all anxious to see this wonderful valley."

Orland project, California.—Orland aims high. Her farmers want only the best, and in most lines of endeavor they are taking the records for superiority. Orland wins in Berkshires, almonds, oranges, turkeys, and Jersey milkers.

Rochette's Golden Belle, one of the cows owned by M. Fortini, was the Jersey State leader in California for the month of January, 1923, with 78.51 pounds of butter fat.

Her barn mate, Silverine Pearl's Duchess, has just finished a record of 657.42 pounds butter fat. Mr. Ben Covert, of Artois, was fortunate enough to purchase her son, The Duke of Tintagel, before the record figures were received.

Ben knows a good thing when he sees it.

It is good news to report the reorganization of the Northern California Milk Producers. Orland is to be an independent district and will operate its own manufacturing plant. Only in the marketing of its products will it become closely identified with the large State organizations. This organization by securing distribution will render great service.

Discriminating buyers largely attended a recent sale of choice pedigreed Jersey stock at Orland, nearly all of which will remain on the project. One lot of aged cows, heifers, and calves averaged \$171.10 per head. Another lot of five good cows went for \$218 each. All pedigreed stock with registry catalogued sold at good prices. Grade stuff and inferior stock got no buyers.

Glenn County now has a certified Flock Association, which will establish certified chickens on Orland ranches in the near future. Having established the rule that the cow has to earn her keep and a bit more, the lowly hen is under investigation. She'll have to do more than scratch and cackle hereafter if she wants to save her head.

C. E. Sims, an Oregonian farmer, came to visit and decided to stay for good. He bought a going-concern farm and moved right on the place. Mr. Sims has sent back home for a string of stock and expects to develop a model ranch.

Grand Valley project, Colorado.—Under the last lateral in the extreme west end of the High Line district of Mesa County a farmer is located who is making a successful start under a good plan of farming for the High Line territory. Two years ago Mr. W. E. Weir located on a homestead at this point, and to-day his ranch gives every appearance of having been in operation for 8 or 10 years.

He is putting forth his greatest effort in getting started with a good dairy herd. At the time of taking this land he had one grade Holstein cow. About a year ago he added several grade heifers to his herd and a pure-bred Holstein bull calf. Recently he purchased four additional grade heifer calves at the Otis Clymer sale, so that his entire herd now numbers six cows producing milk, six fine heifer calves, and a pure-bred bull, and Mr. Weir says that

the cream check which he receives every two weeks very easily takes care of the feed bill for his herd, as well as a good feed bill for his family. He is using the skimmed milk to feed the calves and a small bunch of Duroc Jersey hogs, and from the growth they have made, as well as from the sleek appearance of their coats, one would judge that they were not underfed.

A well-developed crop system is being used with the land, and Mr. Weir does not believe in taking everything out of the ground and not putting anything in the soil. He has already plowed up a piece of alfalfa ground, and is this season putting potatoes in this same piece. Enough corn is produced to feed his horses, cows, and hogs, and also a small acreage of potatoes that can be harvested early for the market. Last year Mr. Weir grew about 3 acres of potatoes, which was all he could plant for an early crop. These matured early in the season, and he received \$1.60 per hundred for them. He intends to follow out this same system of farming with the hope of keeping a good-sized dairy herd and producing enough feed to maintain it, besides producing one cash crop.

Mr. Weir is one farmer in Mesa County who has done well during the past year and who feels that there is not so much cause for the farmer to feel discouraged, as some people would have us believe, when the farming methods followed are consistent with the latest theories advanced by our agricultural colleges and extension workers, which are the application of a diversified farming.

The certificate of incorporation of the United Fruit Growers' Association, the first cooperative marketing association formed under the provisions of Colorado's recently enacted marketing law, were filed recently in the office of the county clerk. The incorporation was granted in the office of the secretary of state on April 16, the first of the cooperative marketing associations in Colorado.

The association will deal in fruits of all kinds produced in the Grand Valley, and the organizers believe it will be one of the chief factors in the marketing of these crops. They will be in readiness for business at once.

Boise project, Idaho.—Pay checks amounting to \$18,000 monthly are paid to more than 500 dairymen for the products from 2,000 cows near Boise. It was shown by a canvass of the several creameries in Boise. It was found that it takes 10 pounds of milk to manufacture 1 pound of cheese and that each month the dairymen of this section produce more than 120,000 pounds of cheese, for which a large wholesale jobber in the east pays \$16,000.

Fred Schomburg, of Nampa, retired dairyman and condensery operator, maintains four cows on one acre of Idaho bluegrass pasture. He doesn't guess at his costs and receipts but keeps actual figures. Here are the figures for four months:

Receipts.

Milk sold from four cows (transportation deducted):	
November, 1922	\$81.04
December, 1922	81.33
January, 1923	77.36
	239.73
Five pounds milk daily for home use, at \$4.50 per month	13.50
Total receipts	253.23

In producing this Mr. Schomburg fed 6 tons of alfalfa hay, costing him \$10 a ton, or a total of \$60. In addition a small amount of chop feed and a few potatoes were fed. Six tons of hay returned \$253.23 in milk; one ton, costing \$10, returned one-sixth of this, or \$42.20.

In other words, the cows ate \$10 worth of hay, for which they returned the cost of the hay and a profit of \$32.20, which is better than 300 per cent return; or, to put it on a per-cow-per-month basis, each cow returned better than \$21 a month, as is shown by the following figures:

Four cows, three months.....	\$253.23
Four cows, one month (one-third of \$253.23) ..	84.41
One cow, one month (one-fourth of \$84.41) ..	21.10

"It is possible for the people of the Boise valley to make this a dairy center that will outrank Elgin, Ill., the famous Tillamook section of Oregon, or any other dairy territory that I know anything about."

Thus does Fred Schomburg of Nampa summarize the possibilities of Boise Valley. At a time when forward-looking individuals and organizations are seeking a firm foundation on which to build a lasting commercial structure in southwestern Idaho, a man who speaks with the authority of successful accomplishment virtually says of the dairy industry.

"This is your one best bet; play it for all it's worth."

Minidoka project, Idaho.—Rupert's city council has appropriated \$1,000 for the purpose of putting a tourist park in readiness for the auto tourists. Citizens have agreed to cooperate by furnishing labor and teams needed to put the ground in condition. Suitable buildings of concrete blocks, electrically lighted and heated, will be erected at once. The lot was donated to the city by Mr. G. R. Shilling, now a resident of the Philippines, but formerly of Rupert.

Flathead (Indian) project, Montana.—Twenty-eight people came recently to the Charlo country of the Flathead project. Two of the heads of families have purchased farms and three others have leased farms. Five carloads of outfit, consisting of 35 head of horses, 6 dairy cows, 35,000 pounds of seed, farm equipment, etc., came with the settlers. It is stated that this is but a beginning of an immigration that will come to the lower-priced lands of the Flathead project as soon as these people have demonstrated the productiveness of the country.

Rio Grande project, New Mexico-Texas.—The first chapter of this season's cantaloupe industry was started with the arrival of William Lane from Brawley, Calif., who is here to superintend the planting of acreage in the Vinton and Canutillo districts. The Crutchfield & Woolfolk Co., with headquarters at Pittsburg, have charge. Several hundred cars of melons are shipped to eastern markets each year from the valley.

Careful examination of the fruit trees in the valley indicates there will be a fruit crop of extraordinary size this season. This is in the orchards also where smudge pots were not used. Horticulturists are jubilant.

Hats off to Bassett and Tooley, of El Paso, who are receiving congratulations of El Paso's citizens on the big way in which they put over a drive for a \$150,000 publicity fund. Backed by the press, Bassett and Tooley, after a strenuous campaign, have secured the necessary pledges which, in El Paso, means the money is raised. The next forward and

most important step is to receive options on all lands available for farmers, after which the advertising and publicity work may be safely undertaken.

El Paso has done a big and wise thing in supporting the campaign. The goal was set at a high figure, but we are confident that this fund wisely expended will show such results that it will be made an annual contribution to the city welfare for a number of years. Once more, as many time in the past, we can say "El Paso again has made good."

Percy W. Barker, who for many years has operated a successful truck farm near Las Cruces, advises farmers not to overlook the small crop. He made \$1,650 on an acre of radishes this year.

From an acre of egg plants he received \$830 and \$600 from an acre of peppers. From 1 acre of each of the following, as an average, he made the following returns: Chili, \$430; cantaloupes, \$270; asparagus, \$260; spinach, \$240; cucumbers, \$210; cabbage, \$170; beans, \$135; and sweet potatoes, \$125.

Where in the world will you find a more attractive opportunity for poultry growers than the Rio Grande project? For every egg produced in the valley and sold there 20 are brought in from the outside. There are 30,000 hens in El Paso valley, only a few of which are members of the Egg Producers Association. Just to show that this organization has no lines of caste, a general invitation to all the hens from the pedigreed beribboned prize winner to the little brown hen of the Mexican 'dobe shack has been extended by the El Paso Chamber of Commerce to join the association. The Chamber of Commerce wants to establish a co-operative marketing plan which will see to it that all eggs are candled, classified, and standardized. El Paso County is receiving from outside 15 cars of eggs monthly, while local stock never run more than a carload.

Yakima Irrigators Oppose Wholesale Extensions of Time of Payment.

At a recent meeting of about 50 representative irrigators and others interested in reclamation from various parts of the State of Washington, held in Yakima, the matter of postponement of payment of water charges was discussed and a resolution adopted from which the following is quoted:

The present terms of payment on reclamation projects, viz, 20 years' time without interest, which usually begins to run after the project is completed and in operation, are very easy. It is doubtful whether the public as a whole should be taxed in order to give to the beneficiaries of reclamation expenditures longer or more favorable terms of payment.

We believe that the West is bound to have a commercial and industrial growth which will make essential the continuation of a broad Federal reclamation policy. Any effort to repudiate or postpone indefinitely repayment of reclamation advances will be detrimental to the development of the West as a whole and should not be countenanced.

The products grown or made in 1922 by the boys and girls in agricultural extension clubs are valued at over \$8,600,000.

PROJECT WOMEN AND THEIR INTERESTS.

By Mrs. Louella Littlepage.

England's Extension Work.

IN one of the large group of buildings occupied by the Department of Agriculture on the Mall in Southwest Washington, the extension workers have a little conference room, and every Tuesday morning a meeting is held there of interest and educational value to the men and women who are helping to turn farming into a high-grade profession.

On May 1 we were privileged to attend one of these meetings. The speaker was Miss Minnie Zimmerman, an English woman, who is president of the Women's Institute in that country. Their activities correspond very closely to those of our extension work, except that they are not confined to rural women.

Miss Zimmerman's interesting talk was given with a charming English accent, and she prefaced her remarks with a little incident which amused her very much. Becoming confused as to direction at one of the circles here one day, she asked her way of a street official. Receiving a rather wooden stare, she repeated her inquiry and was greeted with: "Beg pardon, madam, but can't you speak English?"

The establishment of the Women's Institute in England in 1915 was brought about by the extreme food shortage incident to the World War. A Mrs. Watt, who had successfully organized the women of Canada, went to England to start to work, forming the first center in Wales. There are now 2,000 of these "centers" in England.

The Board of Agriculture pays half the cost of operating, and the members raise the rest. A charge of two shillings per annum is made to each member. There is also a small charge for learning the various industries which have been taken up since the war, and the surplus goes into a sinking fund which now amounts to £12,000. The teachers receive no pay.

The women were so fed up on saving and serving and recipes during the war that they won't hear of food, but they receive instruction in many industries and enjoy social and educational functions at regular intervals.

Basketry, leather work, glove making, and millinery are favored occupations, and Miss Zimmerman had a number of articles made by these women, some of whom are not only supplying their families but are making a good living from these articles manufactured at home. Glove making is particularly remunerative.

Miss Zimmerman was interested in our work and is anxious to bring about cooperation between the

teachers here and in England for mutual advancement.

These centers seem to be a combination of what would be extension and club work, many of the meetings being social in character. For instance, the center at Essex this year started their program with a social afternoon, during which the undergraduates from Cambridge gave folk dances. At the next meeting there were Shakespearean readings and tableaux. This was repeated in the evening, a charge being made to the public and the proceeds donated to the baby clinic.

Then followed three lectures on the history of Essex and a fancy dress ball. Among the characters, all historically correct as to costume, etc., were officials, the gentry, the abbess, nuns, monks, etc.

Occasionally they all take their own needlework and just gossip.

The president gave a garden party.

The manager of the National Guild showed lantern slides.

It is to be hoped that some plan of cooperation between the two countries can be adopted.

Scrapbooks.

"The Carlsbad Chamber of Commerce has started a scrapbook," announced a local newspaper, and immediately we took the entire chamber of commerce into our heart. There is no more enjoyable or profitable pastime than keeping a scrapbook, and joy and discrimination grow with experience.

The Carlsbad organization expects to keep any and everything which pertains to the interest of Carlsbad and the country surrounding in the way of clippings from newspapers and magazines, and all citizens are requested to keep an eye out for material which would be of interest and value for reference in this scrapbook. This book will be kept for reference, so that at any time statistics or any special information is desired it may be obtained without a continued search of all the archives in the country.

A certain woman in mind has the most entrancing book shelf consisting entirely of scrapbooks. Their making has been almost the work of a lifetime, but they contain a mine of valuable information on every subject dear to the heart of woman. There is one on music, one on art, several books of poetry, human historical incidents, local history, personal notes, gardens, one charming collection labeled "My house o' dreams," and giving illustrations and descriptions of floor plans, furniture arrangement, cozy corners, draperies and linens, quilts, etc.

The book which bore marks of most constant use was the cookbook. This was not, as the name would imply, a collection of recipes—her recipes were filed under subjects in a card-index box—rather it contained articles on the origin and history of various foods and dishes, menus, suggestions for entertainments and celebrations, tables for calculating calories, etc., illustrations of table decorations, and poems relating to the subject. Some recipes were included, especially for foreign and unusual dishes.

The book on period furniture and china was profusely illustrated, as was also the book on styles and fabrics, and the information in the latter as to care of various articles, removal of stains, dyeing, bleaching, etc., was very valuable.

The "personal notes" book was, as the name indicated, a very personal affair. In it were birth and death notices, weddings, newspaper notices concerning family and friends, and many pictures, not only those cut from newspapers, but kodak and other views. As time went on and styles and customs changed, the mingling of mirth and pathos the perusal of this book produced made it a very highly prized addition to the collection. The collection of poultry and garden notes were most interesting.

The making of scrapbooks will prove a fascinating pastime for the children on shut-in days, but try one yourself, and if you never indulged before you will bless the Carlsbad Chamber of Commerce for bringing this suggestion to your attention.

Yakima's Pansy Woman.

Occasionally one hears of a woman who is following some unique occupation, quietly doing what she wants to do and making it bring her a living, and the wonder grows as to why women ever sigh for a pleasant as well as a profitable business.

Miss Pearl Redfern, of Yakima, known locally as "the pansy woman," is one of the wise women who has chosen the delightful occupation of raising pansies as her life work. She not only has rows and rows of pansies in her garden, but has an entire 50-foot lot devoted entirely to these plants. Last year she sold over 1,000 dozen plants and had more than 12,000 plants in blossom, and the indications are that she will do even better this year.

During her life, Miss Redfern's mother grew a limited supply of pansies for sale to her acquaintances, but the daughter upon succeeding to the business went into pansy growing on a much larger scale.

In July or August the "pansy woman" plants the seeds in long rows. She buys choice seed by the ounce instead of in packages. Inside of a week the plants appear above ground. By the end of the summer they are vigorous and able to survive the winter. As soon as frost is out of the ground in the spring the plants start growing and bloom very early.

Anyone who has taken up floriculture seriously knows that the successful growing of plants or flowers for sale is hard work, but if one loves flowers and work in the open it is a fascinating occupation.

During the busy season Miss Redfern spends practically all day long in her garden, weeding, irrigating, transplanting, and picking flowers. She is a modest little woman in her gray dress and gray sun-bonnet, and does not pretend to be an authority on flowers, even pansies, but she gets results and is happy while she is doing it. Yakima is proud of her.

Fruit Trees for Shade.

A new note has been sounded in tree planting on the Newlands project, Nevada, where one of the centralized schools has just put in a dozen fruit trees—apples, pears, and cherries—instead of the nonproductive conventional varieties which are commonly planted.

The pupils are delighted with the new trees, and their care will be sure to arouse an interest in fruit culture, and at the same time the children will get a new angle on plant architecture as applied to the beautification of home grounds. There are several varieties of fruit trees which are very decorative, and they can be substituted satisfactorily and profitably in many places for trees which produce shade only.

We have in mind an attractive city home. While the house is "detached," the lot is only 60 feet wide and a driveway occupies a strip along one side. Instead of screening this drive from the house with the usual planting, a row of apple trees have been set out, and on the narrow strip which separates the paving from the neighbor's lot a row of seckel pears extends from the street to the garage at the back of the lot. This variety resembles somewhat the Lombardy poplar in "architecture," and the blossoms, and later the glossy leaves and fruit, form a most attractive border.

An Educational Flower Show.

The town of Orland, on the well-known California project, has a new high-school building, and the largest room was recently turned into a bower of blossoms as one of the first public events in the splendid edifice, when the students opened their first flower show.

There were two sections of the display, the native wild flowers forming one department of the exhibit, and cultivated roses and other "tame" flowers forming the other. The display of native wild flowers comprised more than 100 varieties, flowers of every hue of the rainbow, and from the minute but delicate blossoms that so often go unnoticed, to the more gorgeous flowers that have made California famous for its floral wealth. The specimens gathered by the students were plainly labeled, with both the common

names and the botanical family to which they belong, and the pleasing array attracted much attention.

The roses and other cultivated flowers were arranged with careful regard to color schemes and made a beautiful showing.

This exhibit served as more than an esthetic display. The botany class used it, the agricultural class gained information as to pollination, the art class took lessons in form and color, and the domestic class also made use of the show. Other schools, under the guidance of teachers, visited the exhibit in relays.

Owing to the problematical success of the show, no advertising was done in advance, but the professor who instigated the movement plans to make this an annual affair, and hereafter the public will be asked to cooperate, making the exhibition a festival which will be one of the charming features of the spring season in Orland. It is estimated that at least 200 varieties of wild flowers can be gathered together in that vicinity, and with the almost unlimited supply of cultivated blossoms there is no reason why Orland's annual flower show should not attract thousands of people from all over northern California each year.

Public Playgrounds.

While public playgrounds in their number and management proclaim the progressiveness of their city, the small towns as a rule have apparently given little thought to the matter. Playgrounds in project towns or near the centralized schools would serve a double purpose in that not only the town but the country children who live in the vicinity might enjoy their advantages.

It costs comparatively little to prepare public spaces for playground purposes. Not much apparatus is needed. In fact, many games can be played and enjoyed by girls and boys of all ages with no apparatus or practically none. But the importance of playground supervision can not be ignored.

And not only supervision, but leadership is required. Many persons are disposed to laugh at any suggestion that children need assistance in their play, but anyone who has ever had anything to do with boys and girls knows that a certain kind and amount of leadership are necessary in order to engage everybody in play groups and encourage healthful and pleasant recreation. Without leadership or supervision there is always a tendency to limit participation in games to a small minority, the stronger and more enthusiastic. Supervised play, where all are encouraged to take part, has high educational value. It is of value not only in connection with regular schooling, but also as a wholesome measure of training in cooperation and for good citizenship generally.

Playground teachers in El Paso, Rio Grande project, have taken the initiative in a movement to conduct a few summer playgrounds this year as specimens

of what might be done to care more adequately for the recreation needs of the people. Members of several of the business men's clubs at once indicated their interest and have formally requested the city council to appropriate \$1,000 as a beginning.

It is proposed to employ three playground supervisors for three months each, at \$100 per month, and to provide \$100 additional for expenses.

If the business men, individuals, the clubs, and other organizations will get together on the proposition, there is no reason why every town and thickly settled community can not find means to equip a playground with simple apparatus and provide a suitable person to supervise the children in healthful and profitable activities.

Cheese Making.

The Nevada Agricultural College is advocating cheese making as a home industry, and demonstrating before interested spectators at community centers the ease and small equipment required for producing cheese. This food can be made in from four to six hours with equipment which costs about \$10. It ripens in from four to six weeks. Every dairy farm, according to the professors, could easily make sufficient cheese for its own use and have a surplus for sale, while the whey is a valuable food for hogs.

School Girls' Fashion Show.

"All who think the 1923 girl is a frizzle-headed, scatter-brained, nonpractical model," says the El Paso Herald, "should have seen the fashion show and clothing contest exhibit at the high school Monday afternoon. They would have found that hemstitching and buttonholes are quite as familiar to these girls as the latest thing in vanity boxes or song hits."

It seems that the home economics department of the high school gave a very original fashion show, showing new models in sport wear, afternoon frocks, and dainty summer dancing dresses, while the home economics departments of the city schools conducted a clothing contest which included junior highs as well as the senior school.

The slogan which seemed to dominate the participants was "Economy is the thing!" The girls stepped from behind the cover of a large magazine labeled "Vogue." The cover design was made by an art student in the high school. Unlike most style shows, where elaborate garments are shown which are only a temptation to the girl with a limited income, this show stressed economy. Charming white middie suits, the very thing for summer tennis, picnics, and sport wear in general, were exhibited by the young dress-makers, who announced that the total cost of such a costume was \$1.30.

During the fashion show the high-school orchestra played soft music.

The supervisors have impressed the girls with the fact that the real test in dressmaking is the becomingness and suitability of the garment, and the remarkable thing about the dresses exhibited was that they were so well suited to the individual wearers. The models included a gray and green linen sport dress, an apricot voile dancing frock daintily trimmed with lace medallions, a brown taffeta afternoon dress, etc.

Besides quality of workmanship, the girls were judged by the cost of the dresses and the taste exhibited in choosing accessories, such as shoes and stockings, hair dressing, etc. Winners of the contest attended the State contest at Fort Worth the following week.

The high schools are not carrying off all the laurels in El Paso, as the lower grades also are closing the school year with laudable exhibits, readin' and 'ritin' and 'rithmetic, as well as music, drawing, domestic art, and manual training, showing the progress made during the year by the boys and girls. Even the kindergarten children are singing and marching and showing elephants, drums, sunbonnet babies, and gay paper flowers fashioned by tiny hands.

How school work has advanced from the primitive little red schoolhouse of a generation ago. In the art class the students training fits them to draw the designs for sewing or for furniture and other articles made by the manual-training class. These classes link history with their work in studying period furniture and the dress of different periods of history.

One school reports the establishment of an "opportunity room," where children bring articles which have been discarded at home. These are decorated or made over at the school into attractive and useful articles. Pickle and perfume bottles and crockery become vases when sealing wax in clever design is applied, old garments are made into all sorts of things for the home, and altogether the children are receiving practical training for living.

May Day fêtes on various projects have entertained parents and friends with their charming and varied programs of singing, folk dancing, and physical exercises.

All these events which mark the closing days of the school year should emphasize one fact—that the teachers as a rule are not understood and appreciated as they should be, and that their salaries, no matter how generous they may be, can not compensate for the wonderful part the teachers play in the physical and mental development of the children. Teachers are usually taken too much for granted.

Their services are no more connected with the well-trained, well-educated child than the kitchen range is connected with a delicious and well-served dinner. When things go wrong, the teacher is easily and quickly blamed, but when school life is progressing favorably the teacher is seldom commended for it.

The parent-teachers' associations are correcting this condition to a great extent. But this is only one of the good things these associations are bringing about. If you have no such organization in your school district, why not?

Spotless Town.

Local papers are proclaiming Rupert, Minidoka project, Idaho, as absolutely clean, and one is constrained to believe them for two reasons—250 loads of rubbish and ashes were hauled away and dumped by the city during their recent clean-up week. The other reason is that the clean-up campaign was conducted under the auspices of the Rupert Woman's Club. They are giving the city officials much credit for their cooperation. Five teams were used by the city, and the residents can now invite the public to inspect their town to the farthest corner, even the alleys being shining and entirely devoid of cans and rubbish.

Secretary Wallace Sends Letter of Appreciation.

THE SECRETARY OF AGRICULTURE,

Washington, May 1, 1923.

DEAR DOCTOR WORK: On my recent visit to the Southwest I came into contact with several of the members of the United States Reclamation Service, and I wish to express my appreciation of the uniform courtesy which they extended to me. I had particularly pleasant visits with Mr. Lawson, the project manager at El Paso, Tex.; Mr. Preston, the project manager at Yuma, Ariz.; and Mr. Young, the engineer in charge for the Reclamation Service at Las Vegas, Nev. (Boulder Canyon).

In the course of my trip I visited the Grand Canyon, which lies adjacent to some of our forests in Arizona, and your park superintendent there, Captain Bolton, was most courteous and kind in taking me about and showing me the best points of observation in the few hours I was able to spend there.

I also had a very pleasant visit with Mr. Marble and others, of the Indian Service at Albuquerque, and in company with them stopped at the Pueblo village just outside of that city.

You have some fine people and some fine work going on in that part of the country, and I was very glad to get an occasional glimpse of it while going over the work of this department in the same region.

Sincerely yours,

(Signed) HENRY C. WALLACE.

HON. HUBERT WORK,

Secretary of the Interior.

RECLAMATION LAW NOTES.

By Ottamar Hamel, Chief Counsel, R. S.

Oklahoma v. Texas.

ONE of the most interesting legal battles of recent date was the contest in the United States Supreme Court between the States of Oklahoma and Texas over the location of the common boundary line between those two Commonwealths. The case is of special interest to readers of the RECLAMATION RECORD, as it involved questions of law relating to public land and navigable waters and because one of the results of the decision of the court will be a substantial accretion to the reclamation fund.

The Red River rises in the panhandle of Texas near the New Mexico boundary and takes its course easterly and southerly to the Mississippi. Its total length is about 1,300 miles. The first 557 miles from its mouth are in Louisiana and Arkansas, 539 miles are on the boundary between Texas and Oklahoma, and the remaining 204 miles traverse the Texas panhandle. In the dispute between the two States, Texas claimed the medial line of the river as the common boundary, while Oklahoma contended that the south bank of the river was the dividing line.

The quarrel became acute with the discovery of oil in the bed of the stream. Portions of the disputed area were taken and held by force and intimidation. Suits for injunction and the adjudication of individual rights were filed in the State courts and some decisions were rendered. Both States assumed jurisdiction over the same area. An armed conflict followed between rival aspirants and was in progress at the institution of the case in the United States Supreme Court. The militia of Texas had been called to support the orders of the courts of that State, and an effort was under way to enlist the militia of Oklahoma for a like purpose. The United States Supreme Court found it necessary to appoint a receiver over a portion of the area in dispute and to vest such receiver with power to take and hold the bed of the stream and the oil and gas improvements and proceeds therefrom until the court could render its decision.

In the United States Supreme Court Oklahoma contended that Red River was navigable and was entirely within that State, and therefore the State was the proprietor of the entire bed of the river. On the other hand, the State of Texas, while agreeing that the stream was navigable, claimed that the middle of the river was the line, and therefore the south half of the bed was the property of the Lone Star State. The United States intervened, disputed the claim of navigability, and set up ownership to the entire river bed in the Government.

The court found from the evidence that, as a matter of fact, which is the test of navigability in law, the Red River is a nonnavigable stream along the boundary of Oklahoma; that, under various treaties and the act admitting Texas into the Union, this part of the Texas boundary stops at the river's south bank; that, since the river is not navigable, no part of the title to the bed passed to Oklahoma on its admission to the Union; that the United States, having disposed of its lands along the north bank of the stream by allotment to Indians and to Oklahoma for school purposes, those who now own the upland by virtue of these dispositions hold the bed of the river to its medial line; that Texas could pass no title beyond its borders, and therefore the title of owners of lands riparian to the river on the south must stop at the south boundary of Oklahoma, or, in other words, at the south bank of the river; and that, as the boundary of Texas extends only to the south bank of the river, the bed of the river between the Texas boundary and the middle line is in Federal ownership. (See *Oklahoma v. Texas*, 252 U. S. 372; 253 U. S. 465; 256 U. S. 70, 602; and 258 U. S. 574.)

The land thus confirmed as public domain consists of a strip about 539 miles long and one-half of a mile wide more or less. It has been computed at 220 square miles, or 140,800 acres. Of this area 1,240 acres are in a rich, developed oil field, and extensive prospecting is being carried on to extend its development.

By act of March 4, 1923 (Public No. 500), the land in question has been subjected to the provisions of the oil leasing act of February 25, 1920 (41 Stat. 450), and it is anticipated the reclamation fund will receive a substantial addition through oil royalties on account of this new domain. This act also contemplates an equitable adjustment of accounts with those interested in the wells heretofore drilled on the property.

Yuma County Water Users' Association v. Schlecht.

On April 30, 1923, the United States Supreme Court affirmed the decision of the United States Circuit Court of Appeals, sustaining the right of the Secretary of the Interior to issue the public notice of April 6, 1917, announcing a construction charge of \$75 per irrigable acre for lands in the Valley division of the Yuma Federal Irrigation project in Arizona.

Suit was brought by the Yuma County Water Users' Association against project officials for the purpose of contesting the right of the Secretary to

fix the charge in question. The association contended that a certain letter by the Secretary of the Interior, dated May 10, 1904, was a public notice within the meaning of the reclamation law and fixed the maximum liability of the water users at \$35.26 per irrigable acre. The association also claimed that its contract provided that payment for construction should not be required until the project was completed and that the project was still incomplete, and therefore public notice announcing charges could not be legally issued. The United States took the position that the project was complete so far as the Valley division was concerned, that the Secretary's letter was not a public notice, and that the water users must pay the cost of construction as announced in the public notice of April 6, 1917.

On February 26, 1920, after a trial on the merits, United States District Judge William H. Sawtelle dismissed the suit. From this decision the association appealed to the Circuit Court of Appeals, and on November 7, 1921, that court affirmed the decision of the trial court (275 Fed. 885). The decision of April 30, 1923, by our highest judicial tribunal, forbids further court action by the association.

State Interference with Federal Instrumentalities.

The driver of a United States mail truck on a street which is a post road is not subject to arrest, conviction, and imprisonment because the lights on his truck, which are those prescribed by the regulations of the Post Office Department, do not conform to the requirements of a State statute. (Ex parte Willman, 277 Fed. 819.)

Annual Meeting of Ditch Riders and Water Masters, Yakima Project, Washington.

The annual meeting of ditch riders and water masters on the Sunnyside division was held on April 7, starting with a luncheon at Planters' Hotel, Sunnyside, at which 28 men from the service and water-users' organizations were seated. After the luncheon the meeting adjourned to the division headquarters and was opened with short talks by J. L. Lytel, project manager; M. D. Scroggs, irrigation manager; James A. Cheyne and C. A. Chrestenson, water masters; D. L. Carmody, maintenance engineer; and G. E. Rodman, secretary of the Sunnyside Valley Irrigation District, on general phases of the season's work, with particular emphasis on "service" to the water users. The greater part of the afternoon was taken up with discussion of operation and maintenance problems. The season's program was outlined, instructions given, and policies explained.

A similar meeting was held on the Tieton division at Tieton headquarters on April 14. Ten ditch riders;

H. D. Antles, water master; Robert B. Van Horn, maintenance engineer; J. C. Moore, superintendent of irrigation; and J. L. Lytel, project manager, were in attendance. Plans for the season's work were gone over, special problems discussed, instructions given, and policies outlined. A picnic lunch was served on the lawn at headquarters, in which the wives and families of the ditch riders participated, about 45 all told. The outing and lunch were much enjoyed by all.

These annual meetings of the operating force prior to the opening of the irrigation season are of great benefit to all concerned.

Minidoka Project Optimism.

Barry Dibble, project manager of the Minidoka project, Idaho, reported as follows concerning economic conditions on the project:

One very encouraging feature is the number of sales of farms that are being made to dairymen. A much more optimistic feeling also prevails at Burley. The people on the South Side pumping division are gradually getting into the collar and I feel that they will pull themselves out of their difficulties. One particularly favorable thing on the pumping division is the pledging of sufficient cows for the starting of cheese factories at both Burley and Declo. These factories are to be opened by the same Wisconsin cheese man who is operating the cheese factories at Rupert and Paul. He has required the pledging of the product of 300 cows for each factory as a condition of going ahead. With the cheese factory which has been long in operation at Acequia, this gives us five of these institutions on the project. Effort is being made to establish another cheese factory at View.

Making Dollars Out of Alfalfa Hay.

Mr. L. E. Cline, agriculturist on the Newlands project, Nevada, in a summary report of dairy herds tested during March, 1923, makes the following statement:

If the average cow, as reported in the March herd testing work, is charged with 1,100 pounds of alfalfa hay for the month plus an additional amount equal to 16 per cent to make allowance for the hay eaten by dry cows of the herd, it will be found that the average returns for the cattle in the testing association were 1,114 pounds of skim milk and 45 pounds of butter fat for each ton of hay consumed, or we find that 1 pound of butter fat was produced for 44.4 pounds of hay. At the average price of butter fat for March and estimating skim milk worth 30 cents per hundred, we find that the dairy herds of the association made a gross return of \$24.49 for each ton of hay consumed.

Each hen in her pullet year should produce at least 10 dozen eggs, or on the average an egg every three days.

ADMINISTRATIVE AND STATISTICAL PROGRESS REPORTS FOR APRIL, 1923.

Monthly conditions of Principal Reclamation Service Reservoirs for April, 1923.

[Elevation above sea level.]

State and project	Reservoir.	Available capacity in acre-feet.	Elevation.		Storage in acre-feet.			Out-flow in acre-feet.	Elevation of water surface.		
			Spill-way crest. ¹	Lowest gate sill. ²	Beginning of month.	End of month.	Maximum.		Beginning of month.	End of month.	Maximum.
Arizona, Salt River.....	Roosevelt ³	41,305,000	2128.1	1924.6	689,080	696,119	701,647	.....	2102.64	2103.23	2103.69
California, Orland.....	East Park.....	51,000	1199.68	1111.68	46,675	51,060	51,150	.....	1197.28	1199.71	1199.77
Idaho:											
Boise.....	Arrowrock.....	280,000	3211	2956	59,400	144,600	144,600	138,104	3104.5	3156.8	3156.8
	Deer Flat.....	177,000	2518	2488	136,118	154,671	157,755	28,148	2514	2515.8	2516.1
Minidoka.....	Lake Wolcott.....	95,180	4245	4236	90,060	92,180	93,320	405,055	4244.56	4244.74	4244.84
	Jackson Lake.....	847,000	6769	6728	393,790	424,510	424,510	.....	6750.04	6751.41	6751.41
Montana:											
Milk River.....	Nelson.....	70,000	2223	2200	24,400	30,800	30,800	290	2211.8	2213.78	2213.78
St. Marys storage.....	Sherburne.....	66,000	4788	4720	.....	.....	.....	.....	.....	.....	.....
Sun River.....	Willow Creek.....	16,700	4130	4085	11,947	12,495	12,495	180	4124.9	4125.6	4125.6
Nebraska-Wyoming, North Platte.....	Pathfinder.....	1,070,000	5852	5670	373,830	464,980	464,980	33,471	5805.82	5814.8	5814.8
	Lake Alice.....	11,400	4182	4159	4,322	8,493	8,493	.....	4171	4173	4178
	Lake Minatare.....	60,760	4125	4074	39,921	41,563	41,563	.....	4114.2	4115.4	4115.4
Nevada, Newlands.....	Lake Tahoe.....	6120,000	6230	6224	.....	.....	.....	.....	6225.74	6226.22	6226.22
	Lahontan.....	273,600	4162	4060	233,620	217,700	233,620	56,514	4157.7	4155.8	4157.7
New Mexico:											
Carlsbad.....	McMillan.....	45,000	3267.7	3241.6	21,750	14,000	21,750	13,000	3263	3260.8	3263
Rio Grande.....	Elephant Butte.....	2,638,000	4407	4231.5	1,432,463	1,365,220	1,432,463	95,260	4370.9	4368.3	4370.9
Oregon, Umatilla.....	Cold Springs.....	50,000	621.5	560	40,200	48,200	48,200	5,763	614.73	620.31	620.31
Oregon-California, Klamath.....	Clear Lake.....	462,000	4540	4514	376,000	383,000	386,000	.....	4536.7	4537	4537.1
South Dakota, Belle Fourche.....	Belle Fourche.....	203,000	2975	2921	149,200	156,220	156,220	.....	2967.6	2968.6	2968.6
Utah, Strawberry Valley.....	Strawberry.....	250,000	7558	7517	212,600	222,600	222,600	.....	7552.8	7554.2	7554.2
Washington:											
Okanogan.....	Conconully.....	14,400	2290	2232	3,100	4,480	4,480	53	2259.4	2264.4	2264.4
Yakima.....	Bumping Lake.....	34,000	3426	3389	2,930	17,160	17,160	.....	3393.6	3411.6	3411.6
	Lake Cle Elum.....	20,800	2134	2122	26,985	28,975	29,925	950	2135.3	2138.1	2136.5
	Lake Kachess.....	210,000	2258	2192	88,875	132,375	132,375	.....	2227.2	2236.5	2236.5
	Lake Keechelus.....	152,000	2515	2425	85,675	111,980	111,980	.....	2483.5	2497.6	2497.6
Wyoming, Shoshone.....	Shoshone.....	456,600	5360	5132.3	322,349	336,686	336,686	19,750	5337.4	5340.1	5340.1

¹ Or maximum storage.² Or zero storage.³ Zero water depth at elevation 1902.2.⁴ Amount of silt shown by silt survey deducted from original capacity.⁵ Proposed regulation.⁶ Estimated low-water limit under proposed plan of regulation.⁷ Elevation of reservoir raised 12 inches by stop logs in spillway.

SALT RIVER PROJECT, ARIZONA.

April began with four crews in the field. On the 10th one crew was discontinued. With a daily average of 125 man-days and 18 stock-days the following maintenance work was done: 13½ miles of main canal cleaned; 66 miles of lateral cleaned; 14 miles of main canal brushed; 35 miles of main canal demossed; 195 old structures repaired; 5,301 linear feet of riprap placed; 4½ cubic yards of concrete placed; 330 cubic yards of earth excavated; 673 cubic yards of earth embankment placed.

With a daily average of 50 man-days and 1½ stock-days, the following construction work was done from maintenance camps; 8 miles of new waste ditch dug; ½ mile of new irrigation ditch dug; 26 new structures installed; 600 linear feet of 24-inch concrete pipe installed; 154 linear feet of 36-inch corrugated iron pipe installed; 30 linear feet of 30-inch corrugated iron pipe installed; 107 cubic yards of concrete placed; 4,634 cubic yards of earth excavated; 560 cubic yards of earth backfill; 3 concrete culverts installed; 1 terra cotta chimney installed in zanjero house; 2 terra cotta chimneys installed in camp, N. S., permanent.

The P. & H. one-half-yard machine excavated 6,945 linear feet of waste ditch, completing the ditch work of the Chandler wells ditch.

The concrete pipe plant resumed making pipe April 7. With a daily average of 4½ man-days and 2 stock-days, 1,440 linear feet of 24-inch and 4 linear feet of 30-inch concrete pipe were made.

Operation of power system.—Total power generated during month, 9,128,650 kilowatt-hours; maximum daily output April 19, 325,610 kilowatt-hours; maximum load April 1, 14,585 kilowatts; maximum daily average load, 13,732 kilowatts; average load for month, 12,660 kilowatts; highest daily load factor, 96.9 per cent; lowest daily load factor, 78 per cent; monthly load factor, 86.8 per cent.

The output of the power system for the month was 18.5 per cent greater than the output for April of any preceding year. The Roosevelt, Cross Cut, and South Consolidated power plants operated continuously during the month. The Arizona Falls plant operated practically continuously. The Chandler plant operated 97.5 per cent of the time.

Ten new customers were connected during the month for domestic lighting and power.—C. C. Cragin.

YUMA PROJECT, ARIZONA.

The second cutting of alfalfa was being harvested, there being a ready demand at \$16 per ton. The majority of the alfalfa was being turned to seed. Weather conditions were favorable for cotton planting, and about 90 per cent of this crop had been planted; good stands were being secured. The Ruth dredges cleaned 17.3 miles of laterals during April.

Construction work in drainage was continued, 3,900 feet of the North drain having been completed by the class 14 Bucyrus 2-yard machine, the excavation amounting to 21,500 cubic yards, and 4,400 feet of the Southwest drain having been completed by the 30-B Bucyrus 1-yard drag line, excavation amounting to 17,000 cubic yards.

The maximum discharge of the Colorado River was 30,200 second-feet, the minimum discharge was 5,600 second-feet, the mean was 18,106 second-feet. The total run-off was 1,077,000 acre-feet, with a gauge height of 19.64 feet.

Among the project visitors were: Secretary of Agriculture Henry C. Wallace, Special Assistant Secretary D. W. Davis, Director A. P. Davis, and Hon. Miles Cannon.

Mesa division.—At the pipe-manufacturing plant 8,752 linear feet of pipe were manufactured; 7,816 linear feet were hauled to the field. The half-mile of No. 72 flume on lateral B-20 was completed during the month and 9 structures, involving 25 cubic yards of concrete, were finished. The force main was backfilled by the P. & H. half-yard drag line, back fill amounting to 3,400 cubic yards, and 1,785 feet of trench for 18-inch pipe on lateral B-20 was dug, amounting to 1,250 cubic yards. An additional 20 second-foot pumping unit was installed in the B lift pumping plant. Young citrus trees were growing well, although growth was somewhat impeded by sand storms.—*Porter J. Preston.*

ORLAND PROJECT, CALIFORNIA.

Rainfall occurring during the early part of April broke an extended drought of 47 days' duration and averted a serious water shortage on the project for the coming irrigation season. Following the rain there was a period of two weeks during which no water deliveries were required. There was only a light demand for irrigation water during the later portion of the month owing to the general harvest of alfalfa. East Park reservoir was filled to maximum capacity on April 11.

Cutting of a heavy first crop of alfalfa was in progress at the close of the month. Spring plowing of those orchards which were unplowed on account of dry conditions prevailing in March was made possible by the April rainfall. Grain prospects on the dry-farmed areas in the community were materially improved as a result of the rain.

Special Assistant Secretary D. W. Davis, Reclamation Commissioner Miles Cannon, and Director Davis visited Orland on April 29 and 30, inspected the storage works at Stonyford and the irrigated area of the project, and addressed a public meeting of land owners within the proposed Millsite division.—*R. C. E. Weber.*

GRAND VALLEY PROJECT, COLORADO.

April weather was favorable for construction work. Several light frosts occurred, but little damage was done.

The crop prospects were favorable. The acreage in beets was materially increased over last year and a good stand was reported by most growers. Most of the orchards carried a heavy bloom and farmers were hopeful of a successful season.

The operation of the irrigation system was continued without interruption. Several minor breaks in laterals, caused by weeds, occupied the attention of small maintenance crews.

The construction under way for supplying water to the Orchard Mesa Irrigation District was pushed vigorously and water will be available within a few days. All excavation for the Colorado River siphon was completed and the concrete barrel was finished in the river section. There remained to be concreted approximately 75 feet of the siphon barrel, the lower portal, and the upper part of the wasteway operating tower. The flume at the lower end of the siphon was finished on April 26 and the lining of the tunnel on distribution canal No. 1 was stopped on April 28, when 519 linear feet had been rebuilt.—*S. O. Harper.*

UNCOMPAGNE PROJECT, COLORADO.

The uncollected water-rental accounts due on account of irrigation water furnished during the season 1921 now amount to \$1,682.15. The total cash collections on April 30 on account of irrigation water furnished during the season 1922 amounted to \$100,811.82.

Farming operations were delayed to some extent owing to the continued cool weather. Necessary repairs to the concrete lining of the South Canal, including the enlargement of the tap outlet at mile post 6, were completed. The P. & H. drag line completed the removal of slides and necessary ditch cleaning on the main line of the Montrose and Delta Canals on April 10 and work was begun on the cleaning and enlargement of the West Canal on April 14.

The Ruth dredger began work on the cleaning of the Loutsenhizer Canal between Cedar Creek and the North Mesa lateral headgate on April 9. Good progress was made.

Three heavy wind storms occurred during the latter part of the month, which caused many of the small laterals to fill up with tumble weeds, and in several cases minor breaks resulted therefrom.

The Gunnison tunnel was opened up for operation for the season with a flow of 40 second-feet on April 5. This flow was gradually increased according to demand, until on April 27 a flow of 875 second-feet was being diverted into the valley in order to meet the needs of the water users. This diversion was the largest that this project has ever had to make at this time of the season, and is due to the fact that on account of the continued cold weather on the higher areas of the Uncompagne River drainage very little run-off has been available in the river itself.—*L. J. Foster.*

BOISE PROJECT, IDAHO.

April weather was cool.

Labor was fully employed, with a shortage reported in some localities. The wage scale was increased slightly the latter part of the month.

On the farms the seeding of small grains and the planting of early potatoes was completed. The potato acreage will apparently be about 25 per cent less than last year. On account of the dry weather the forage and grain crops received heavy irrigation. The use of water during the month was the heaviest since the project has been in operation.

Water was run in the Main Canal during the entire month; the head varying from 1,000 second-feet on the first to 2,350 second-feet on the last of the month. The entire distribution system was in operation; water was delivered to all portions of the project.

Several breaks occurred on the Deer Flat Low Line and Mora Canals, caused by gophers. The breaks were discovered before any great damage was done to either the adjoining property or to the canal system.

The run-off from the Boise River watershed was 29 per cent below the mean for the past 25 years. There was reported to be considerable snow left in the mountains, which was very compact.

Drainage work was continued on the Drew drain. Work was also under way on a transmission line to supply power for operating draglines on the Wilder Bench and in the Lower Deer Flat areas.

Field work consisted of giving lines and grades for drainage and operation and maintenance work in progress.—*J. B. Bond.*

KING HILL PROJECT, IDAHO.

April was dry and windy. Two days were lost by construction crews on account of high winds.

The force at 6 camps, with 216 men and 40 horses on the 1st, was reduced to 4 camps, with 130 men and 20 horses, on the 30th. The labor turnover was exceptionally heavy, and it was necessary to ship in men from adjacent districts.

Government forces performed the following work during the month: Placed 15,000 feet b. m. of staves, cradles, and sills in Basin siphon; 19 yards of reinforced concrete, 160 yards of excavation, and 45 yards back fill at Bennett Creek siphon spillway and blow-off; canal enlargement was completed, 6,710 yards of class 1 material being excavated; placing of 150 cubic yards concrete completed the lining of Main Canal; at Basin siphon the 54-inch lock-joint pipe was reinforced with 16-pound bent rails and 75 cubic yards of concrete; 1,200 cubic yards of class 1 were excavated at this structure. In silting the sides and bottom of the Main Canal 500 square yards of gravel and 9,000 square yards of poultry wire were placed. Thirty cubic yards of concrete and 150 cubic yards of back fill were required to complete drainage of the One Mile flume. Five hundred and thirty yards of back fill were placed at Lateral 6 siphon; 3E siphon was back filled and completed; 150 yards of excavation, 14 yards of rock paving, and 9 cubic yards of concrete were put in at Lateral 4E siphon. Pump No. 2 was installed and put in operation. On King Hill siphon 485 linear feet of 26-inch wood-stave pipe, 618 linear feet of 15-inch lock-joint pipe, and 167 cubic yards of concrete lining were placed and 2,300 cubic yards of class 1 excavated. On lateral enlargement 6,070 yards were excavated. Two hundred and thirty linear feet of metal flume were erected on Lateral 4 and 80 feet of metal flume installed on Lateral 12. Sixty yards of class 1 were excavated and 7½ yards of concrete and 14 yards of paving placed on Lateral 13. Two checks, 5 drops, 13 farm turnouts, 2 Main Canal turnouts, 10 weirs, and 3 bridges were installed.

Water was turned into the Main Canal on the 8th and put through the system in four days.

Gophers caused a break in the Main Canal, requiring replacing of 800 yards of canal bank. Water was out of the system 12 hours. Weeds caused considerable trouble by filling canals and laterals. A maintenance crew of 10 men was engaged repairing siphons,

replacing turnouts, and installing weirs.—*A. M. Raven.*

MINIDOKA PROJECT, IDAHO.

Rainy weather prevailed during April.

Nearly 300 applications for relief under the act of February 28, 1923, had been received, a little less than two-thirds of these being on the Pumping division and the balance on the Gravity lands.

An active campaign was being carried on over the American Falls Reservoir District in favor of the bond election to be held May 12. Meetings were held at American Falls on April 3 and 4 to discuss work already done in connection with the reservoir and plans for the future. These meetings were attended by the directors of the American Falls Reservoir District, commissioners of the counties in which the district is situated, Chief Engineer Weymouth, District Counsel Patrick and Stoutemyer, and others.

The lining of the Main South Side Canal at the head of the F waste canal, and the repairs to the drop on the waste canal were completed. Operation of the irrigation system on the South Side Pumping division was started on the 30th, with 110 second-feet pumped at the first lift. On the Gravity division the flow in the main canal had increased to 700 second-feet at the end of the month.

At American Falls topographic surveys were made of the river channel below the falls and surveys and studies were made in connection with a water supply for the new townsite. Studies were continued of the general water supply in Snake River.—*Barry Dibble.*

(Crop report on next page.)

HUNTLEY PROJECT, MONTANA.

Favorable weather prevailed during April.

Good progress was made in all lines of maintenance work; the main canal repairs were completed and water can be turned in at any time. The Austin dragline completed cleaning of the Reservoir Line Canal and moved to the Highline extension and will clean about 1½ miles of this canal.

A 15-inch siphon 500 feet long was laid on Lateral R in order to move the ditch back from the bank of Fly Creek. Numerous other small structures were built on the lateral system; these were all replacements. Cleaning of the small laterals and ditches will be postponed as late as possible, in order to destroy weeds and prevent their growth.—*A. R. McGinness.*

MILK RIVER PROJECT, MONTANA.

April weather was warm and pleasant with temperature and precipitation about normal, but it was not until the end of the month that frost was out of the ground sufficiently for construction work to be resumed. Ice went out of the Milk River about the 10th, and on the whole the season is rather backward and soil unusually dry. Farm work, including double disking and reseeding several alfalfa fields, was proceeding rapidly. Labor was scarce the last part of the month.

Maintenance included putting the canal system in condition for operation, overhauling draglines, automobiles, and other equipment, poisoning gophers, and other routine matters. Canals were put in operation about the middle of the month and 500 acre-feet delivered to water users.—*Geo. E. Stratton.*

ST. MARY STORAGE.

April weather was cold and the season backward. Little field work could be done. The amount of snow

Crop report, South Side pumping division, Minidoka project, Idaho, 1922.

Crop.	Area (acres).	Unit of yield.	Yields.		Per unit of yield.	Values.	
			Total.	Average (per acre).		Total.	Per acre.
Alfalfa.....	15,215	Ton.....	39,343	2.6	\$5.00	\$314,744	\$20.69
Alfalfa seed.....	25	Bushel.....	48	1.9	7.00	336	13.44
Barley.....	1,182	do.....	24,884	21.0	.60	14,930	12.63
Beans.....	5	do.....	82	16.4	4.80	393	78.60
Beets.....	3,320	Ton.....	38,157	11.5	7.00	267,100	80.47
Clover hay.....	311	do.....	463	1.5	5.00	2,315	7.44
Clover seed.....	1,120	Bushel.....	4,265	3.8	8.00	34,120	30.46
Corn.....	60	do.....	1,537	25.6	1.00	1,537	25.61
Corn, fodder.....	19	Ton.....	189	9.9	4.00	756	39.78
Garden.....	304					18,577	61.10
Oats.....	1,120	Bushel.....	34,722	31.0	.50	17,361	15.50
Onions.....	4	do.....	620	155	1.00	620	155.00
Pasture.....	1,796					20,019	11.15
Potatoes.....	9,318	Bushel.....	2,201,125	236.2	.25	550,281	59.06
Wheat.....	9,320	do.....	266,189	28.6	.80	212,951	22.83
Less duplicated areas.....	535						
Total cropped.....	42,290	Total and average.....				1,456,040	34.43
		Areas.			Acres.	No Farms.	Per cent of project.
Orchard.....	65	Total irrigable area farms reported.....			48,126	111	98.7
Young alfalfa.....	802	Total irrigated area farms reported.....			45,290	909	92.8
Young clover.....	175						
Fall plowed.....	142						
Miscellaneous.....	2,351						
Less dup. areas.....	535						
Total irrigated.....	45,290	Total cropped area farms reported.....			42,290	110	86.3

Crop report, gravity division, Minidoka project, Idaho, 1922.

Crop.	Area (acres).	Unit of yield.	Yields.		Per unit of yield.	Values.	
			Total.	Average per acre.		Total.	Per acre.
Alfalfa hay.....	24,178	Tons.....	74,286	3.1	\$7.00	\$520,004	\$21.51
Alfalfa seed.....	155	Bushels.....	420	2.7	7.00	2,940	19.03
Apples.....	206	do.....	11,835	57.2	1.00	11,835	57.20
Barley.....	1,782	do.....	61,250	34.3	.60	36,750	20.62
Beans.....	116	do.....	2,077	17.8	3.00	6,231	53.35
Sugar beets.....	1,945	Tons.....	24,362	12.6	6.00	146,173	75.15
Mangles.....	20	do.....	313	15.3	5.00	1,567	76.46
Clover hay.....	1,928	do.....	3,868	2	5.00	19,338	10.03
Clover seed.....	1,448	Bushels.....	4,964	3.5	8.00	39,950	27.59
Indian corn.....	1,318	do.....	44,070	33.4	1.00	44,072	33.42
Corn fodder.....	147	Tons.....	1,018	6.92	4.00	4,072	27.70
Small fruit.....	48	Pounds.....	118,450	24.60	.03	3,553	73.80
Garden.....	154					34,272	56.60
Common hay.....	154	Tons.....	262	1.6	5.00	1,312	8.48
Oats.....	2,867	Bushels.....	87,687	30.6	.50	43,844	15.30
Onions.....	30	do.....	1,972	66	1.00	1,972	65.73
Pasture.....	4,343					53,324	12.27
Peas.....	3	Bushels.....	73	■	2.00	146	52.15
Potatoes.....	6,322	do.....	1,380,280	218.3	.25	345,070	54.59
Rye.....	5	do.....	30	6	.70	21	4.20
Wheat.....	9,950	do.....	289,077	29.1	.80	231,262	23.24
Miscellaneous.....	550					15,602	27.87
Less duplicated areas.....	610						
Total cropped.....	57,520	Total and average.....				1,563,310	27.18
		Areas				Acres.	Farms.
Young alfalfa.....	3,125	Town sites.....				414	1,542
Less duplicated areas.....	345	Total irrigable farms reported.....				71,997	
		Total irrigated area farms reported.....				60,300	
Grand total irrigated.....	60,300	Total cropped area farms reported.....				57,520	

in the St. Mary storage basin is greater than normal, indicating probable high water in the streams later in the season. At the end of the month snow conditions were such that it was impossible to operate St. Mary Canal.

Construction work was confined to work on one bridge at the lower end of the canal and operation and maintenance work was confined to minor repairs to canals and structures.—*R. M. Snell.*

SUN RIVER PROJECT, MONTANA.

April was generally favorable for outside work and good progress was made in preparing the ground for crops and seeding grain. No water was delivered for irrigation on the Fort Shaw division, but water was run in the canals to furnish stock and irrigation water to farms south of Fort Shaw. The Ruth ditcher has been working in cleaning out the main canal where a large quantity of silt had blown in during the winter months. A force of men was employed in distributing gopher poison on both the Fort Shaw and Greenfields divisions and getting the canals ready for operation.

On the repair job on Greenfields Main Canal all material required for the work had been delivered and everything was in readiness at the 1st of May to make good progress. On drainage work open drain B had been completed and the dragline was moved the 1st of May to the lower end of open drain C. A second dragline was received from the Riverton project at the end of the month, and this machine unloaded, and after moving to the lower end of drain B a change will be made from gasoline engine to electrical machinery.

The earthwork contractors on the lateral system completed their work, and the structural contractor had increased the working force and was making an earnest effort to finish the work covered by his contract on or before June 15.

About 60 acres of sugar beets will be planted on the project this year. The seed has been delivered and machinery purchased for planting and taking care of the crop.

During the month the following shipments were made from the three principal shipping stations: Fort Shaw, 18 cars of hay, 2 cars of potatoes; Simms, 13 cars of hay, 4 cars of potatoes, 1 car wheat; Fairfield, 9 cars of wheat, 1 car of flax, 1 car of potatoes.—*Geo. O. Sanford.*

LOWER YELLOWSTONE PROJECT, MONTANA-NORTH DAKOTA.

April was unfavorable for field work.

The ice in the Yellowstone River broke up on April 2. No damage was done to canals or structures.

The field man of the Great Western Sugar Co. had secured contracts for the planting of 3,500 acres of sugar beets. The later contracts were made with farmers in the vicinity of Dore, N. Dak. One farmer near Crane had 50 acres already planted to beets.

Wooden farm turnouts to be used for the units that require water under the newly constructed extension work were constructed and dipped in creosote at Ridgeland and Thomas Point. Flashboards, guides, and foot planks to be used in checks were cut, treated, and delivered.

Under advertisement No. 55 contracts were entered into with John S. Penson, of Williston, N. Dak., for schedule 1, and John Klug, of Fairview, Mont., for schedules 2, 3, and 4, March 28, 1923. The con-

tractors were unable to start work during the month but were making preparations to start as soon as the weather permitted.—*H. A. Parker.*

NORTH PLATTE PROJECT, NEBRASKA-WYOMING.

On the Interstate division the usual rush of work incidental to getting the canals and laterals in shape for the delivery of water was in progress. The condition in which a number of fields were left last fall by the farmers in connection with the high winds has caused an unusual amount of ditches to become filled with drifting sand. In addition to the amount of cleaning on which the yearly estimate was based there are 17 miles more in the first lateral district and 14 miles in the second lateral district which require cleaning. Water was turned into the canal on the 14th for the purpose of filling the lakes before the irrigation season begins. There was less water in the lakes at this time of the year than there had been for a number of years. The Ruth lateral cleaning machines were started to work on the first and second lateral districts as soon as the frost was out of the ground.

On the Fort Laramie division laterals were cleaned and preparations made to have the system ready to deliver water as soon as it would be needed.

On the Northport division canals and laterals were in bad condition on account of drifting sand and weeds and cleaning has been carried on as weather permitted and the system will be in shape for water delivery as soon as it is needed.

On the Interstate division main canal enlargement was in progress with two Monighan gasoline draglines, two P. & H. draglines, and one Bucyrus class 14 dragline.

On the Fort Laramie division two Bucyrus draglines were employed on canal excavation, one Bucyrus electric dragline on drainage work, and one Austin gasoline dragline at the Horse Creek siphon. This structure was 95 per cent completed. On the Horse Creek lateral system, the east branch of the Table Mountain lateral system, and the Main canal between Horse Creek and the State line such work as hauling gravel, lateral excavation and placing concrete was being carried on by contractors and Government forces.

The entire force on construction on the Northport division, together with construction equipment, has been transferred to the Fort Laramie division and will be employed on that portion of the division east of Owl Creek. A construction camp has been built and a start made on the Browns Canyon siphon.—*Andrew Weiss.*

NEWLANDS PROJECT, NEVADA.

Weather was favorable for outside work.

Lahontan power plant was operated from the Truckee Canal. The use of water for irrigation was comparatively light for April. Maintenance forces cleaned 1½ miles of laterals in the V district and 1 mile in the Truckee district, using teams. The Ruth dredger cleaned laterals over a length of 45,000 feet in the V district. Eleven minor timber structures were installed and eight similar structures were repaired by maintenance forces. Three miles of drains were cleared of weeds in the Truckee district.

Contract earthwork on the Dudley, Woods, Mayfield, and Turpin laterals to replace the old Scott ditch through the city of Fallon was completed with approximately 7,150 cubic yards of material involved.

The average unit cost was about 15 cents per cubic yard. The Dudley lateral timber flume, 406 feet in length, was completed. Placing of other structures in these lateral was in progress.

Eighteen timber structures were installed in the new Scrimsher, R, and other laterals.

With 7 dragline excavators in operation, including a small Austin machine on operating and maintenance drain cleaning work, drainage forces excavated 250,000 cubic yards of material. Forty-one structures involving 66,464 M. b. m. of lumber were placed in drains.

Pending receipt of final layout and designs from Denver preliminary work in connection with the new Lahontan power penstock was done. The dump trestle for disposal of excavated material from the main tunnel was practically completed. A small drain tunnel 47 feet in length was driven. General equipment for the penstock work was being assembled.

Headquarters were established at Reno, Nev., early in April and a survey party was placed in the field for the location of the feed and outlet canals for the proposed Spanish Springs reservoir. Engineer Ferd Bonstedt has charge of this work.

The board appointed to appraise lands for right of way purposes in Spanish Springs reservoir site completed field work and report at the end of the month.

On April 28 Special Assistant Secretary D. W. Davis, Director A. P. Davis, and Reclamation Commissioner Miles Cannon visited the project and were taken over the various districts. Inspection of the Lahontan and Carson diversion dams was made.—*John F. Richardson.*

CARLSBAD PROJECT, NEW MEXICO.

April weather was cold with several high winds.

The maintenance foreman, with a small crew of men, was engaged doing minor protection work and strengthening portions of the main canal banks. A small team crew was employed at the close of the month strengthening the west bank of the main canal above east canal headgates.

The total amount of water delivered to the farms amounted to 13,370 acre-feet.

The irrigation of alfalfa was completed about the 25th. The irrigation and preparation of land for planting the cotton crop was in progress and was about 70 per cent completed. The weather was rather unfavorable for the germinating of seed and little cotton was up to the stand at the close of the month. Rainfall delayed planting operations.

Twenty cars of fat cattle and 36 cars of fat sheep and lambs were shipped from the project during the month. The total collections on operation and maintenance accounts amounted to \$13,663.24.—*L. E. Foster.*

RIO GRANDE PROJECT, NEW MEXICO-TEXAS.

April passed without any damage by frost, and as a result there are prospects for one of the largest fruit crops, and those who took a chance on early planting of cotton are the gainers.

Extension of the distribution system, especially in the lower portion of the project, was being rushed to meet the new demands for irrigation service. Water for irrigation was released from the reservoir during the entire month and was delivered through the entire distribution system for irrigation purposes, the decrease in storage amounting to 67,243 acre-feet.

In the Rincon Valley construction of the Garfield drain was completed, and the machine, after undergoing repairs, will begin on lateral construction.

In the Mesilla Valley drainage construction again became the main item, and three machines working on this feature excavated 22,080 cubic yards from 5 miles of drain. Two P. & H. excavators continued on lateral and levee construction, two Ruth machines on lateral reconstruction, and two small laterals were constructed by team crews. Structure work consisted of 16 minor structures on drains and 68 on laterals.

In the El Paso Valley one P. & H. excavator and one 30-B Bucyrus were employed on lateral construction, the Ruth ditching machine being used the entire month on lateral cleaning, making a record for length of canal covered, having bermed 11.97 miles of lateral bank, moving 13,020 cubic yards. After completing work in the vicinity of the Tornillo Canal heading, Bucyrus 9½ excavator No. 34 moved to the lower outlet of the Tornillo drain on the 18th, so that two 9½ excavators were progressing with drainage construction and 0.8 mile of drain was constructed, moving 38,109 cubic yards. The excavator on the River drain was employed the greater part of the month on leveling spoil banks for roads. Two small team crews were employed on miscellaneous lateral work. Structures totaled 5 minor structures on drains and 88 minor structures on canals and laterals.

Special Assistant Secretary D. W. Davis, accompanied by Director A. P. Davis and Field Commissioner Miles Cannon, were on the project on the 20th and 21st.—*L. M. Lawson.*

NORTH DAKOTA PUMPING PROJECT.

The weather was very unfavorable. April was the coldest and wettest April for many years. The Missouri River broke up April 9, or four days later than the extreme record. The Little Muddy rose to a record stage, carrying out bridges, including a temporary bridge built by the service, and flooding all the low lands of the project.

Intermittent snows and rain precluded maintenance work and none was done on the lateral system. There was a general overhauling of the smaller units in the power plant and of the boilers in the boiler room.

In the coal mine the narrow work incident to two north and south entries was finished and room necks were turned off. Timbering was placed and track laid. About 200 feet of a weak section of the haulage way was timbered.

The regular commercial power operations were conducted; 80,550 kilowatt-hours of electrical energy were delivered to the city of Williston, representing an increase of about 2,000 kilowatt-hours over the same month of last year.—*Wm. S. Arthur.*

UMATILLA PROJECT, OREGON.

Ideal growing weather prevailed throughout April. Absence of killing frost gave promise of a good fruit crop.

Farmers were busy getting ditches in shape, spring toothing alfalfa, and irrigating; spraying of orchards as well as cultivating was general.

The irrigation systems of both divisions were in operation during the entire month. Small crews were also employed repairing minor breaks in pipe lines and ditches and in general maintenance work.

Seventy cubic yards of class 1 material were excavated; 1,147 cubic yards of backfilling placed, and 500 linear feet of 24-inch and 1,850 linear feet of 16-inch concrete pipe were laid in connection with sup-

plemental construction, lateral extensions. On betterments 565 linear feet of concrete lining 2 inches thick were placed, 130 cubic yards of class 1 material excavated, and 44 cubic yards of concrete placed. On the lateral system of the West division under original construction 125 cubic yards of class 1 material were excavated and 76 cubic yards of concrete lining placed.

On April 5 a poultry field day demonstration conducted by Professor Crosby, of the Oregon Agricultural College, took place on the farm of William Rhodes and Ralph Williams. Instructive lectures were given on proper feeding, care, and business methods that should be followed to insure a profit.—*H. M. Schilling.*

KLAMATH PROJECT, OREGON-CALIFORNIA.

April was favorable for all farming and construction operations. The farmers generally have their spring work well along. Most of the cattle had been transferred to the summer range; the sheep will follow in the near future. Lambing was completed.

Water was turned into the canals on April 24 and water deliveries will begin on May 1. Two Ruth ditch-cleaning machines were engaged in cleaning canals and laterals. A small crew in each of the twelve ditch-riding districts was engaged in cleaning laterals and in repairing minor structures.

In the Tule Lake division the excavation for the canal and lateral system had been completed. The concrete canal structures were about 85 per cent completed, and about 75 per cent of the lateral structures had been installed. Puddling of the canal and lateral structures was about 65 per cent completed.

In the Langell Valley division the diversion dam was practically completed. On the lower end of the West Canal fair progress was being made by the contractors. The upper eight miles of this canal will be constructed by dragline excavator. This work will be begun about May 15. Bids will be opened on May 5 for installing farm turnouts on the West Canal.

At the Horsefly dam site a small crew was put to work to investigate foundation conditions. If the proposed contract between the United States and the Langell Valley Irrigation District is favorably voted upon, work on the dam will begin about June 30. The dam will be of concrete of the variable radius type, and the maximum height will be about 75 feet.

The Keno and Ankeny Canals and the Leavitt tract were sold at public auction on April 25. The properties were appraised at \$120,614. Only one bid was received, that of the California-Oregon Power Co. for \$120,620.

Hon. D. W. Davis, special assistant secretary, Hon. Miles Cannon, field reclamation commissioner, and Director A. P. Davis arrived at the project on the evening of May 1.—*Herbert D. Newell.*

BELLE FOURCHE PROJECT, SOUTH DAKOTA.

The cold, dry weather experienced in March continued well into April. A 9-inch snow that fell on the 6th and 7th was followed by below-zero temperatures on the 8th. On the 20th a snowfall of 1 inch occurred and heavy frosts continued almost to the end of the month.

Farm work was two or three weeks behind schedule and farmers on the heavier soils were not able to do much field work until near the close of the month. As a result of the late season, there will be a rather large area planted to corn this year.

Sheepmen were much encouraged with the high percentage of lambs saved and with the prospect of 50-cent wool. The lamb crop averaged around 100 per cent, and it is encouraging to note the number of farmers who have managed to get hold of a band of sheep.

Maintenance work was backward, owing to bad roads and cold weather, but a crew of five or six men worked out from each of the three maintenance headquarters during the greater part of the month. Large repairs to substructures were made on both the Indian Creek and Stinkingwater Creek flumes, and one concrete chute about 250 feet long with 25 cubic feet per square second capacity was built.—*B. E. Hayden.*

Prevailing crop prices at close of April, 1923.

Project.	Alfalfa hay, per ton.		Barley, per bushel.	Oats, per bushel.	Wheat, per bushel.	Potatoes, per bushel.
	In stack.	Baled at shipping point.				
Salt River.....	\$11.00	\$15.00			\$1.20	
Yuma.....	12.00	16.00	\$1.00		1.20	
Orland.....	8.00	13.00	.75		1.14	
Grand Valley.....	10.00	13.00	.80	\$0.70	1.15	\$0.50
Uncompahgre.....	8.00			.66	1.08	.30
Boise.....	7.00	10.00	.60	.55	.96	.30
King Hill.....	8.00					
Minidoka.....	6.00	9.00	1.17	.53	.99	.30
Huntley.....						
Milk River.....	8.00	10.00	.38		1.07	.45
Sun River.....	8.00	12.00	.75	.70	1.06	.25
Lower Yellowstone.....	7.00-10.00		.41	.35	1.07	
North Platte.....						
Newlands.....	9.00	13.00			1.80	.60
Carlsbad.....		25.00				
Rio Grande.....		18.00				
North Dakota pumping.....	15.00				1.04	.30
Umatilla.....		16-18				
Klamath.....	8.00-10.00		.84	.77	1.08	
Belle Fourche.....	3.00-6.00		.70	.45	.90	
Strawberry Valley.....	12.00	3.00	.85	.75	1.05	
Okanogan.....						.60
Yakima.....		18.00				.52
Riverton.....	10.00	14.00	1.00	.80	.91	.45
Shoshone.....		13.50			.85	.60
Indian projects:						
Blackfeet.....	10.00		1.20	.56	.92	
Flathead.....	10.00	14.00			.95	.30
Fort Peck.....	10.00			.26	1.06	.50

STRAWBERRY VALLEY PROJECT, UTAH.

April weather was generally mild and fair, with intermittent storms. Conditions generally were favorable for farming operations. Planting of sugar beets was completed, with some increase in acreage reported.

Strawberry Reservoir will again be filled to overflowing for the fourth time since storage of water commenced.

The Power Canal was cleaned of debris accumulated from winter operation and made ready for irrigation season.

The project power plant was in continuous operation, furnishing 83,435 kilowatt-hours to the several

project towns. Revenues received amounted to \$1,844.

Total collections during the month on account of construction and operation and maintenance charges were \$5,730.—*W. L. Whittemore.*

OKANOGAN PROJECT, WASHINGTON.

The weather throughout almost the entire month of April was generally mild and bright. The project farmers were busy in the completion of their pruning, the hauling and burning of the brush pruned from the orchards, and the spraying of the orchards at the proper times. However, a frost occurred on the last day of the month and as the apple blossoms were out at the time some damage was done to the crop.

Maintenance work was continued with a varying crew of men and operation was begun with the Duck Lake pumping plant on April 2. This plant was cut off on April 8 and again started on April 22 and run until April 28. During the time of these operations some gravity water was also run for spraying. The Robinson Flat pumping plant was started for irrigation on April 26 and continued throughout the month.

The mechanical force was busy throughout the month in finishing repairs to pumping plants and electrical equipment and the operation of these several units.

The returns during the month for the last of the apple shipments were more encouraging and the project growers were receiving something for these apples over and above the cost of growing and marketing.—*Calvin Casteel.*

YAKIMA PROJECT, WASHINGTON.

The mean temperature for April was about normal; precipitation for the entire Yakima watershed was below normal. At the close of the month 7 inches of snow remained on the ground at Lake Keechelus and 4 inches at Bumping Lake, with only a trace of snow at Kachess and Cle Elum.

Granger Irrigation District.—Work continued on the Granger siphon with good progress. At the close of the month the manufacture of the pipe was about 81.1 per cent completed and laying about 56 per cent completed.

Sunnyside division.—Demand for water was heavy, owing to lack of precipitation and warm weather. The maximum quantity diverted into the main canal was 1,144 second-feet. Delivery of water was continuous to the various pumping districts. Maintenance consisted of the repair of three minor breaks—on Snipes South Branch Canal, Snipes lateral 10.61, and on lower end of Rocky Ford Canal.

Tieton division.—The first diversion of water for spraying was from South Fork of Cowiche Creek on the 5th, two weeks earlier than last year. The Main Canal was put in operation on the 21st with a diversion of 25 second-feet, which was rapidly increased to 290 second-feet at the close of the month. Cleaning and repair of Main Canal was completed during the fore part of the month. Work on main laterals was confined to minor repairs to concrete portion of D-1 siphon, replacement of head walls and gates on five turnouts along Lateral G, and reconstruction of concrete diversion dam across North Fork Creek channel (5 feet high by 100 feet long), which was undermined and washed out by the early run-off in this creek. On account of early demand for water,

only about 75 per cent of the spring program on sub-laterals could be carried out.

Betterment work on this division consisted in installation of 24-inch reinforced concrete pipe, 24 to 32 inch creosoted wood-stave flume, 12-inch wood-stave flume, 6 to 12 inch plain concrete and vitrified tile, and 6 to 10 inch tile, concrete and wood pipe to replace worn-out wooden flumes and defective wood and concrete pipe.—*L. L. Lytel.*

TIETON DAM.

April weather was favorable.

Two steam shovels worked on spillway excavation for a total of 21,000 yards. The electric shovel was in the borrow pit, excavating for the earth fill. The embankment for the month amounted to 74,000 yards. Concreting of the core wall started the middle of the month and 700 yards were placed.

The drier weather was of benefit to the reservoir clearing, as it has made possible the starting of burning by both the Government forces and the contractors.

The average force employed was 450 men.—*F. T. Crowe.*

RIVERTON PROJECT, WYOMING.

Except for a heavy snowstorm on April 22 the weather was favorable for construction. Roads were in good condition except the latter part of the month.

On the Wind River diversion dam drag line 121474 loaded material on wagons for back fill. Twelve thousand cubic yards of embankment, 4,770 cubic yards of back fill, and 1,010 cubic yards of riprap were placed. The placing of the head gates and sluice gates was practically completed. Dismantling of the plant was completed. On the first division of the canal drag line 121322 excavated 2,080 cubic yards for the Midwest siphon and was then moved to Riverton and shipped to the Sun River project. Trimming for canal lining was in progress; 740 cubic yards were excavated. The lining of the canal with concrete was begun on April 20 and 267 cubic yards of concrete was placed. The bridge at station 13, the culvert at station 30, and the turnout for the Driskell ditch at station 63 were completed, involving the placing of 129 cubic yards of concrete and 853 cubic yards of back fill. Preparatory work was done for other canal structures. The Koehring No. 2 drag line excavator was received and moved to the work.

Construction Engineer R. M. Conner was assigned to the McKay dam on the Umatilla project and was succeeded by Construction Engineer L. H. Mitchell. Chief Clerk G. H. Murphy resigned, effective April 28, and was temporarily succeeded by Examiner W. F. Kubach.—*H. D. Comstock.*

SHOSHONE PROJECT, WYOMING.

The first half of April was cold and disagreeable, but the latter part of the month was pleasant. A rain and snow storm on the 29th and 30th unaccompanied by heavy winds brought from 0.50 to 0.75 inch of precipitation and did much good to farm lands and the range. As a result of the cold weather the frost was slow in leaving the ground and excavation and farm work were delayed. Many farmers used this period for sorting and hauling potatoes, as a fair market existed most of the month for that product. Farm work made excellent progress in the latter half of the

month and some grain and beets had been sown. Thirty-nine cars of potatoes were shipped during the month; 19 cars of baled alfalfa hay were also shipped, which about exhausts the surplus of hay on the project.

On the Willwood dam the fore apron and north retaining wall were completed, and work on the gravity section was continued throughout the month. The closure of block 5 was effected in the period April 15 to 21, when the river was diverted around the work through the Corbett tunnel and Garland Canal. Since the 21st the river had been passing through the sluiceway in the dam. The class 14 Bucyrus electric dragline continued on the excavation of the Willwood Canal the entire month, excavating 15,200 cubic yards of class 1 and 15,900 cubic yards of class 3 material. The contractor delivered the steel highway bridge that is to be erected over the dam.

At the Willwood bridge the class 9½ gas Bucyrus built the embankment on the south side of the river and worked on the rock excavation of the north approach.

Work on drainage structures was in progress both on the Frannie and Garland divisions most of the month with good-sized crews. Drain ditch excavation was slow, however, in starting owing to frost, and it was near the close of the month before all machines were at work. On the Frannie division there are two class 9½ electric draglines, a class 14 Bucyrus gas dragline, and a 206 P. & H. dragline. On the Garland division there are a class 9½ electric dragline, a 206 P. & H. dragline, and an Austin trencher at work.

Maintenance work was slow in getting started owing to the backward season, and work consisted principally of ditch cleaning, repairs to minor structures, with some replacements by concrete structures, repairs to five concrete storm-water culverts under the Frannie Canal in the Garland division, and some bank-protection work. The Ruth ditch cleaner was also engaged on Lateral D-56 of the Frannie division, cleaning 2.4 miles. Water was turned into the system for the beginning of the irrigation season on the night of the 29th, but was turned out next day on account of the storm and no deliveries were made during the month.—*J. S. Longwell.*

INDIAN PROJECTS, MONTANA.

BLACKFEET PROJECT.

April weather was cold and the season was backward. Conditions were favorable for construction and operation and maintenance, but unfavorable for crop growth.

Construction work consisted of building a timber diversion structure and weir at the head of Four Horns Reservoir outlet canal, completing several short sections of bank in the same canal, and excavating for and cutting lumber for several minor structures on the Two Medicine and Badger-Fisher divisions.

Four Horns Reservoir supply canal was operated from the 23d to the end of the month. Maintenance work consisted of cleaning canals, raising lateral banks, cleaning laterals, and making minor repairs to structures on the Two Medicine and Badger-Fisher divisions, and cleaning silt from the head of Fisher Canal with the dragline excavator.—*R. M. Snell.*

FLATHEAD PROJECT.

April weather conditions were generally good.

At the Hubbard dam concreting was progressing favorably at the end of the month. Drilling of

grouting holes was continued and a small amount of rock excavated. A contract for hauling cement and supplies was awarded to local parties. A rock-crushing plant was received. A force of 53 men and 10 teams was employed.

On the Tabor feed canal the steam shovel crossed Falls Creek through very hard excavation and completed a large part of the excavation for the Falls Creek structure. Construction camp was moved and enlarged for a larger force to be employed on concrete structure work. A gravel-screening plant was received. A force of 40 men and 11 teams was employed.

At the Ninepipe dam a force of 40 men and 90 head of horses was employed at the end of the month. The elevating grader drawn by the tractor began placing embankment in the dam on the 16th. Four-horse Fresno teams placed embankment in the dikes; 12,205 cubic yards were placed. Stripping for dams and dikes was 50 per cent completed. Construction camp was completed and a full crew employed at the end of the month.

Excavation for the lock-joint concrete pipe siphon on the Pablo subdivision was begun and pipe-making plant partly assembled. A small lateral flume 486 feet long was erected. Excavation was begun for structures on Polson lateral C. Minor lateral extensions on the Mission Valley and Camas division were excavated.

Maintenance work was in progress on all divisions and largely completed at the close of the month. Delivery of stock water was made but no deliveries for irrigation. On account of the cool weather at the close of the month creeks were still at low stage.

A shipment of settlers arrived at Charlo on the 2d from the Snake River Valley to buy and lease farms in the Mission Valley. Mr. E. F. Benson, manager of Immigration and Industry of the Northern Pacific Railway Co., visited the project towns April 3 to 5 and addressed the local people on the matter of obtaining settlers. A large number of farms have been listed with committees in each of the project towns.

A carload of Holstein cows from Washington was received on the Jocko division and a carload of calves from Wisconsin for the Camas division.

Weather conditions were favorable for seeding. Shipments of hay and potatoes were strong throughout the month.—*C. J. Moody.*

FORT PECK PROJECT.

April weather conditions were favorable. A general snowstorm occurring on the 25th added considerable moisture to the ground, which was badly needed.

Field work consisted of general cleaning of canals and laterals of weeds and minor repairs of canals and structures. Water was turned into Little Porcupine reservoir on April 12 and the diversion gates were closed on Big Muddy Creek on April 15 for storage in Medicine Lake reservoir. Storage in Big Porcupine reservoir for the month amounted to 1,350 acre-feet.

Seeding of all field crops was well under way and considerable alfalfa was being seeded and prepared for irrigation. Live stock was in good condition.—*E. L. Decker.*

GENERAL OFFICES.

Washington Office.—Director Davis left for an extended Western trip on April 14. He planned to visit

a number of the projects, including the proposed Columbia Basin project, and to be away about two months.

Chief Engineer Weymouth arrived in Washington on April 11, and during the absence of the director is in charge of the office as acting director.

Assistant Director Bien and Chief Counsel Hamele were in the office the entire month.

Statistician Blanchard gave the opening address on April 24 of a series of lectures illustrating some of the interesting activities of the Department of the Interior.

Purchases during the month amounted to \$5,709.23, and the value of the 274 requisitions filled and sales from the storehouse amounted to \$3,422.16.

Publications issued comprised 49 copies of the annual reports and 102 miscellaneous publications. The 27 mimeograph jobs amounted to a total run of 13,420 sheets.

The number of inquiries concerning the service and opportunities for settlement answered by the settlement and information section amounted to 541. At the close of the month the total number of inquiries

from ex-service men concerning opportunities on the land totaled 197,804.

The photographic laboratory turned out work during the month to the value of \$181.15, distributed as follows: Washington office, \$76.20; field, \$78.85; sales, \$26.10.

At the end of the month the RECLAMATION RECORD mailing list totaled 17,318 names.

Mr. Ikuro Yahiro, of the Department of Agriculture, Governor General of Chosen, Japan, was a visitor at the office, after having visited Denver and a number of the projects.

Denver Office.—Chief Engineer Weymouth and District Consul Patrick left Denver on April 1 for American Falls, Idaho. The chief engineer also visited the Black Canyon dam on the Boise project and returned to Denver on April 7. He left for Washington, D. C., on April 9. Assistant Chief Engineer Walter was in Utah at the beginning of April in connection with cooperative investigations being conducted in that State. He then visited the Grand Valley project, returning to Denver on April 6. Assistant Chief Engineer Williams left Denver on April 12 for Mon-

Comparison between operation and maintenance estimates and results, January 1 to April 30, 1923.

Project.	Gross cost.				Net accruals and revenues.				Area paying charges.
	Estimate for 1923.		Actual cost to Apr. 30.	Amount * over or under.	Estimate for 1923.		Actual returns to Apr. 30.	Amount more or * less than estimate.	
	Total for year.	To Apr. 30.			Total for year.	To Apr. 30.			
UNDER PUBLIC NOTICE.									
Belle Fourche.....	\$70,000	\$12,000	\$13,852	\$1,852	\$72,000				Acres.
Boise.....	290,000	87,000	82,751	4,249	241,492	\$8,500	\$25,000	\$16,500	72,448
Carlsbad.....	40,000	16,450	15,250	1,200	55,550	13,750	12,000	* 1,750	161,500
Huntley.....	41,000	12,000	10,543	1,457	42,000				25,000
King Hill.....	33,515	9,000	2,976	6,024	133,515	15,000	23,291	8,291	21,800
Klamath (Tule Lake).....	12,400	1,150		1,150	12,443				10,000
Klamath (main).....	55,000	10,505	10,640	* 135	55,647				9,920
Lower Yellowstone.....	40,000	9,000	6,231	2,769	130,741	15,000	10,807	* 4,193	42,105
Minidoka (south side).....	94,000	28,815	23,038	5,777	99,300				46,000
Newlands.....	111,400	44,378	55,850	* 11,472	114,000	5,020	5,075	55	48,000
North Dakota pumping.....	32,900	(2)	(2)	(2)	102,167	(2)	(2)	(2)	67,741
North Platte (Interstate).....	175,000	40,000	39,359	641	151,000				7,653
North Platte (Northport).....	24,000	3,000	1,258	1,742	124,000	1,258	1,258		110,000
Okanogan.....	52,200	8,141	9,961	* 1,820	54,100	1,200	500	* 1,000	15,000
Orland.....	33,000	13,400	12,700	700	33,618	5,300	5,300		6,918
Rio Grande.....	222,000	78,700	66,000	12,700	1250,000	66,000	66,000		20,174
Shoshone.....	66,000	14,650	13,999	651	66,000	670		* 670	140,500
Strawberry Valley.....	* 25,000	7,600	6,600	1,000	49,200				58,700
Sun River (Fort Shaw).....	11,100	2,000	2,350	* 350	11,500				46,846
Uncompahgre.....	135,000	54,000	56,890	* 2,890	144,500	8,500		* 8,500	10,100
Umatilla.....	37,225	12,000	11,071	929	137,225	1,860	2,200	340	90,000
Yakima (Sunnyside).....	145,000	49,270	48,557	713	150,767	24,000	24,500	500	24,592
Yakima (Tieton).....	96,000	34,000	33,250	750	89,500	125		* 125	87,205
Yuma.....	290,000	75,000	88,000	* 13,000	292,500	88,000	99,000	11,000	32,000
Total.....	2,131,740	622,059	611,126	10,933	2,212,765	254,183	274,631	20,448	1,227,402
UNDER WATER RENTAL.									
Grand Valley.....	50,000	16,000	14,000	2,000	51,300	3,500	3,000	* 500	20,000
Milk River (including St. Mary).....	69,000	17,062	12,700	4,362	18,600	1,240		* 340	45,170
North Platte (Fort Laramie).....	90,000	21,000	19,272	1,728	190,000	19,272	19,272		46,000
Sun River (Greenfields).....	22,000	3,000	2,890	110	22,100				18,000
Total.....	231,000	57,062	48,862	8,200	192,000	24,012	23,172	* 840	129,170
INDIAN.									
Blackfeet.....	30,000	4,500	4,411	89	16,400				20,900
Flathead.....	55,000	8,400	7,890	510	54,500	500		* 500	35,000
Fort Peck.....	15,450	4,100	2,442	1,658	1,100				1,100
Total.....	100,450	17,000	14,743	2,257	72,000	500		* 500	57,000

¹ Returns regulated by district contract.

² Not received in time for publication.

³ Not including tunnel repairs.

⁴ Includes installment of \$25,000 for tunnel repairs.

tana, and during the remainder of the month visited the Milk River, North Dakota pumping, Lower Yellowstone, Fort Peck, and Blackfeet projects. Engineer Munn and Designing Engineer Savage were in the field at the beginning of the month. They visited the Black Canyon dam, Boise project, and returned to Denver on April 6. Mr. Munn left Denver on April 25 for Omaha, Nebr., returning on the 28th. Electrical Engineer Gaylord left Denver on April 3 for a visit to the Riverton, Shoshone, and North Platte projects, returning to Denver on the 14th.

The principal work in the designing section consisted of the following: Continued work on detailed designs for overflow section and on designs for drum gates, Black Canyon dam; prepared design for electric hoists for penstock gates, Boise project; prepared detail design for concrete check for Langell Valley division to replace project design No. K-2-4-13; prepared detail design for concrete wasteway structures, Langell Valley division, to replace project design No. K-2-4-14, Klamath project; started new estimate and preliminary design for Connolly dam, Milk River project; prepared detail designs for forms and other equipment for the manufacture of 96-inch diameter lock-joint pipe in 8-foot units; prepared detail design for siphon, Fort Laramie Canal, station 5685; checked for approval specifications for structures, Fort Laramie Main Canal; completed detail design for siphon, Bald Peak lateral, station 0+00, North Platte project; completed detail design for checks, Wyoming Canal; partially prepared detail designs for turnouts from Wyoming Canal, stations 330, 375, and 415; partially prepared detail designs for check, wasteway, and by-pass structure at Pilot Butte reservoir, Riverton project; continued work on designs for spillway drum gates, Yakima storage.

The principal work in the electrical section consisted of the following: Drawings of foundation walls for the Black Canyon pumping plant were completed and checked; drawing showing location of pumping plant and pipe line profiles was prepared; the superstructure of the pump house was designed and traced; layout of the conduit for power and lighting circuits for the dam was prepared, Black Canyon dam, Boise project; design of the outlet works of Horsefly reservoir was begun, Klamath project; location and design of the new penstock and manifold for the Lahontan power plant was revised to suit the recent survey made on the project; detail drawings of the penstock and connections were prepared; draft of specifications for the purchase of the penstock was completed, Newlands project; studies were made of various locations for the Pilot Butte power plant; specifications for construction of the transmission line by contract were prepared and submitted to the project manager, Riverton project; tracings of the 72-inch outlet pipes for the Tieton dam were completed and are ready to be checked; specifications were issued for two 30-inch gate valves, triplex pump, piping, and miscellaneous equipment for the outlet works; draft of specifications for the 72-inch steel pipe was prepared, Yakima storage; detail drawings and tracings of the emergency gates for Hubbard dam were completed and forwarded to the Washington office, together with specifications for printing.

Among the more important matters which received consideration in the legal department during the month were: Proposed sale of certain lots with im-

provements thereon in town site of King Hill, Idaho; furnishing of water during present irrigation season to lands in King Hill Irrigation District, for which operation and maintenance charges for season of 1922 have not been paid, King Hill project; request of Sunnyside Irrigation District for release of trust deeds and increase of farm units from 40 to 80 acres, Yakima project; sale of timber from withdrawn land adjacent to Upper Klamath Lake, Klamath project; right of way for canals and laterals across State school land in Wyoming, Fort Laramie division, North Platte project. The more important forms of contracts considered, prepared, or transmitted were: Contract with unincorporated town of Savage, Mont., for water supply, Lower Yellowstone project; proposed contract with Cowley Drainage District for cooperation in construction of drains, Shoshone project; proposed contract with Goshen Irrigation District for payment of operation and maintenance charges for irrigation season of 1923, North Platte project; proposed contract with Sidon Canal Co. for drainage crossings under Sidon Canal, Shoshone project; contract with town of Deaver, Wyo., for furnishing of water, Shoshone project.

An average of 431 letters per day was received in the mails and files section; the disbursing section handled 885 vouchers, involving an expenditure of \$209,664.03; in the purchasing section 354 advertisements were issued; 576 vouchers prepared, involving a net expenditure of \$165,707.50; 3,300 rates were furnished for basing purposes in awarding orders and making transfers, and 463 bills of lading were furnished for the movement of materials. The cost and property section handled transfers of material and equipment amounting to \$7,311.48.

Fort Laramie Tunnel No. 3, North Platte Project, Nebraska.

The Reclamation Service has recently, with the approval of the Secretary of the Interior, awarded contract under Specifications No. 416 to R. S. Morrow & Son, Omaha, Nebr., for the construction of Tunnel No. 3 at Station 5813 (entrance) on the Fort Laramie Canal near Gering, Nebr., about 8 miles southwest of Scottsbluff.

This tunnel will be about 6,500 feet, or more than a mile, long, and is located through a hill of brule clay. The tunnel is of horseshoe section with an inside height and width of 10 feet 3 inches, and will be timbered and lined with not less than 10 inches of concrete.

The tunnel will have a capacity of about 622 cubic feet per second when filled within 2 feet of the crown. The grade of the tunnel is 7 feet 11 inches per mile, or $S=0.0015$.

In addition to the 6,500 linear feet of tunnel excavation it is estimated that the work will require 3,000 cubic yards of excavation in the tunnel approaches, 580,000 feet b. m. of timbering, 9,490 cubic yards of concrete lining, and 23,000 pounds of reinforcing steel bars.

ADMINISTRATIVE ORGANIZATION.

DEPARTMENT OF THE INTERIOR.

Hon. HUBERT WORK, Secretary of the Interior.
 EDWARD C. FINNEY, First Assistant Secretary.
 D. W. DAVIS, Special Assistant Secretary.
 FRANCIS M. GOODWIN, Assistant Secretary.
 MILES CANNON, Field Reclamation Commissioner.
 JOHN H. EDWARDS, Solicitor for the Interior Department.
 EBERT K. BURLEW, Administrative Assistant to the Secretary.
 JOHN H. MCNEELY, Assistant to the Secretary.
 JOHN HARVEY, Chief Clerk and Superintendent of Buildings.

U. S. RECLAMATION SERVICE.

WASHINGTON, D. C.

Arthur Powell Davis, director; Morris Bien, assistant director; Otmar Hamels, chief counsel; J. B. Beadle, director's assistant; C. J. Blanchard, statistician; Hugh A. Brown, editor and office assistant; C. A. Blissell, engineer; J. M. Lumey, chief accountant; C. A. Lyman, repayment accounting; Miss H. A. Fellows and Raymond Depue, fiscal agents; C. H. Fitch, chief clerk; Emmet Carr, purchasing agent; G. W. Numbers, appointment clerk; H. N. Bickel, Yakima, Wash., and W. F. Kubach, Denver, Colo., examiners of accounts.

DENVER, COLO.

F. E. Weymouth, chief engineer, Wilda Building, Denver, Colo.; R. F. Walter and C. P. Williams, assistant chief engineers; Miss L. H. Meisel, secretary to the chief engineer; J. M. Gaylord, electrical engineer; J. L. Savage, designing engineer; James Munn, engineer; W. A. Meyer, chief clerk; A. McD. Brooks, purchasing agent; Harry Caden, fiscal agent.

PROJECT ORGANIZATION.

Belle Fourche Project.—B. E. Hayden, project manager, Newell, S. Dak.; B. C. Walber, chief clerk.

Boise Project.—J. B. Bond, project manager, Boise, Idaho; Walter Ward, engineer in charge construction Black Canyon Dam; E. E. Mills, chief clerk; C. F. Weinkauf, fiscal agent.

Carlsbad Project.—L. E. Foster, project manager, Carlsbad, N. Mex.; V. L. Minter, chief clerk and fiscal agent.

Grand Valley Project.—S. O. Harper, project manager, Grand Junction, Colo.; W. J. Chiesman, chief clerk; A. H. Hall, fiscal agent.

Huntley Project.—A. B. McGinnies, project manager, Ballantine, Mont.; G. H. Bolt, chief clerk; Miss M. C. Stimek, fiscal agent.

King Hill Project.—A. M. Rawn, project manager, King Hill, Idaho; T. W. Hause, chief clerk; W. S. Gillogly, fiscal agent.

Klamath Project.—H. D. Newell, project manager, Klamath Falls, Oreg.; N. G. Wheeler, chief clerk; G. R. Barnhart, fiscal agent.

Lower Yellowstone Project.—H. A. Parker, project manager, Savage, Mont.; E. R. Scheppelmann, chief clerk.

Milk River Project.—G. E. Stratton, project manager, Malta, Mont.; E. E. Chabot, chief clerk; G. S. Moore, fiscal agent.

Minidoka Project.—Barry Dibble, project manager, Burley, Idaho; Dana Templin, engineer; E. C. Diehl, chief clerk; Miss A. J. Larson, fiscal agent; F. A. Banks, engineer, American Falls, Idaho.

Newlands Project.—J. F. Richardson, project manager, Fallon, Nev.; A. W. Walker, engineer; G. B. Snow, chief clerk; Miss Ethel M. Simmonds, fiscal agent.

North Dakota Pumping Project.—W. S. Arthur, project manager and chief clerk, Williston, N. Dak.; H. C. Melas, fiscal agent.

North Platte Project.—Andrew Wells, project manager, Mitchell, Nebr.; E. W. Bashore, engineer, Fort Laramie Division; T. W. Parry, irrigation manager; J. R. Ummel, chief clerk; Mrs. A. L. Truax, fiscal agent.

Okanogan Project.—Calvin Casteel, project manager, Okanogan, Wash.; W. D. Funk, chief clerk and fiscal agent.

Orland Project.—R. C. E. Weber, project manager, Orland, Calif.; E. T. Eriksen, engineer; C. H. Lillingston, chief clerk and fiscal agent.

Rio Grande Project.—L. M. Lawson, project manager, El Paso, Tex.; C. A. Peavey, chief clerk; L. S. Kennicott, fiscal agent.

Riverton Project.—H. D. Comstock, project manager, Riverton, Wyo.; L. H. Mitchell, engineer; G. H. Murphy, chief clerk; W. J. Fogarty, fiscal agent.

St. Mary Storage Division.—B. M. Snell, project manager, Brown- ing, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Salt River Project.—Being operated by the Salt River Valley Water Users' Association; C. C. Cragin, general superintendent and chief engineer, Phoenix, Ariz.

Shoshone Project.—J. S. Longwell, project manager, Powell, Wyo.; J. R. Iakisch, engineer; C. M. Jump, superintendent of irrigation; W. F. Sha, chief clerk; Miss L. C. Drinkwater, fiscal agent.

Strawberry Valley Project.—W. L. Whittemore, project manager, Provo, Utah; H. R. Pasewalk, chief clerk.

Sun River Project.—G. O. Sanford, project manager, Great Falls, Mont.; H. W. Johnson, chief clerk; F. C. Lewis, fiscal agent; G. A. Benjamin, irrigation manager, Fairfield, Mont.

Umatilla Project.—H. M. Schilling, project manager, Hermiston, Oreg.; R. M. Conner, engineer in charge construction McKay Dam; G. C. Patterson, chief clerk and fiscal agent.

Uncompahgre Project.—L. J. Foster, project manager, Montrose, Colo.; R. B. Smith, chief clerk; F. D. Helm, fiscal agent.

Yakima Project.—J. L. Lytel, project manager, Yakima, Wash.; R. K. Cunningham, chief clerk; J. C. Gawler, fiscal agent; M. D. Scroggs, superintendent of irrigation, Sunnyside, Wash.; J. S. Moore, superintendent of irrigation, Route 6, Yakima, Wash.; F. T. Crowe, engineer in charge construction Tieton Dam, Rimrock, Wash.; C. F. Gleason and W. C. Christopher, engineers; V. G. Evans, chief clerk; C. B. Funk, fiscal agent.

Yuma Project.—P. J. Preston, project manager, Yuma, Ariz.; R. M. Priest, superintendent of construction; D. C. McConeaughy, engineer, Yuma Mesa Division; D. C. Caylor, superintendent of irrigation; C. A. Denman, chief clerk; E. M. Philbeaum, fiscal agent.

INDIAN PROJECTS.

Blackfeet Project.—R. M. Snell, project manager, Browning, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Flathead Project.—C. J. Moody, project manager, St. Ignatius, Mont.; S. A. Kerr, engineer in charge construction Hubbard Dam; J. M. Swan, chief clerk; J. P. Siebenicher, fiscal agent.

Fort Peck Project.—E. L. Decker, acting project manager, Poplar, Mont.; Henry Berryhill, chief clerk and fiscal agent.

FIELD LEGAL OFFICES.

Boise, Idaho.—B. E. Stoutemyer, district counsel. Projects: Boise, Minidoka, King Hill, and Jackson Lake Enlargement.

Denver, Colo.—Law section office of chief engineer: R. M. Patrick and Armand Offutt, district counsel.

Las Cruces, N. Mex.—Mark B. Thompson, attorney. Projects: Rio Grande, Carlsbad, and Hondo.

Helena, Mont.—E. E. Roddis, district counsel, Helena, Mont. Projects: Blackfeet, Flathead, Fort Peck, Huntley, Milk River, St. Mary Storage, Sun River, North Dakota Pumping, Lower Yellowstone, and Shoshone.

Mitchell, Nebr.—J. N. Beardslee, district counsel. Projects: North Platte, Belle Fourche, and Riverton.

Montrose, Colo.—J. R. Alexander, district counsel. Projects: Grand Valley, Uncompahgre, and Strawberry Valley.

Portland, Oreg.—H. L. Holgate and D. G. Tyree, district counsel, Post Office Building. Projects: Yakima, Okanogan, Umatilla, Klamath, and Baker.

San Francisco, Calif.—P. W. Dent and Brooks Fullerton, district counsel, 349 Pacific Building. Projects: Salt River, Yuma, Orland, and Newlands.

The Reclamation Record

Issued Monthly by the BUREAU OF RECLAMATION, DEPARTMENT OF THE INTERIOR, Washington, D. C.

VOLUME 14, No. 6

Price: 75 cents per year

JUNE, 1923



HON. DAVID W. DAVIS, COMMISSIONER OF THE BUREAU OF RECLAMATION.

Clinedinst.

LETTER FROM SECRETARY WORK TO THE PROJECT MANAGERS.

The Secretary of the Interior,
Washington, June 14, 1923.

To All Project Managers,
Reclamation Service,
Department of the Interior.

Gentlemen: You are this department's representative, on the ground, connecting the department in Washington with those for whom reclamation was devised.

When in your office, or on duty, make yourself available for consultation with the settler, soon to be part owner, with the least possible delay.

Bring about the closest possible relation between your office and the water users, working together with them in their interests first, so that the Government may be protected finally, and for the mutual interests of all.

In case of serious complaint, you should study the case carefully before arriving at a decision. Put yourself in the complainant's place; avoid an arbitrary attitude on any question brought up by the water users. No complaint is unimportant; it is only relatively so. You should hear each case, give it careful consideration, and decide it upon its merits. No better compliment can be paid you, as project manager, than to have it said that you are fair and are willing to hear a matter before rendering your decision. There are times, of course, when questions of local policy may be discussed with the directors of districts or associations with profit to both, thus greatly enhancing the relations between water users' organizations and project employees.

Call conferences; sympathetic discussions will help you as much as anyone. The success of these projects depends on the success of the settler living thereon. You should have a sympathetic understanding of the difficulties of the farmer. You will not, however, be swayed from direct adherence to the law and regulations relative to the project, but these should be carried out with diplomatic determination, even though you face temporary unpopularity.

I hope our managers, who have been construction engineers, may try to distinguish between the constructing and the producing features of the enterprise. We want every project to succeed and become the property of those who must live under it, and at the earliest possible date. No irrigation project can have the maximum success until it is operated by its resident owners—the farmers. In the meantime, the relations between those living on the project and the Government will depend largely upon the department's contact managers.

A Government employee's time is no more valuable than a farmer's in summer time. The word "Private" on the office door of a Government employee is an offense. The development of an irrigation project begins and continues with the Government to completion. Its operation should begin with the settler and tend toward the Government. The open-door policy will in the end succeed and will help immeasurably to build up the Reclamation Service from the farmer toward the department rather than from the department to the farmer.

Please feel free to write to the department for information. There must be mutual understanding before there can be cooperation, so very necessary to the success of reclamation projects.

With best wishes,
Sincerely,

HUBERT WORK.

HON. DAVID W. DAVIS APPOINTED COMMISSIONER OF THE BUREAU OF RECLAMATION.

CHANGES in the Bureau of Reclamation of the Department of the Interior were effected June 18, when Secretary of the Interior Work abolished the office of Director of Reclamation, effective July 1.

In its place he created the position of Commissioner of the Bureau of Reclamation and appointed to this post David W. Davis, former Governor of Idaho, who assumes his new duties at once.

Ex-Governor Davis has been serving as Special Assistant Secretary of the Interior for the last three months. He served as Republican Governor of Idaho for four years, from January 6, 1919, to January 1, 1923, having been reelected to a second term in November, 1920. His home is at American Falls, Idaho, where he was president of the First National Bank of that city until May, 1922, when he retired from the banking business. He was also president of the Idaho State Bankers' Association in 1918 and a member of the Idaho Senate in 1912 and 1914. He was a delegate to the Republican National Convention in 1912.

Born in Wales, England, in 1873, ex-Governor Davis came to America in infancy. At the age of 12 years he worked as a coal miner and was a clerk in the store of a coal company in Dawson, Iowa, when 16 years old. Later he went to Washington and Idaho, where he organized several banks. He has made a deep study of land reclamation and is familiar with problems of the far West.

While Governor of Idaho the Grand Army of the Republic of Idaho unanimously made him an honorary member; he is the only citizen of Idaho to be so honored.

DAIRY DEVELOPMENT OF THE NEWLANDS PROJECT, NEVADA.

By L. E. Cline, Agriculturist.

EARLY observations of the agricultural possibilities of the Newlands project, Nevada, indicated that this locality would be especially adapted to the dairy industry. An abundance of water and fertile soil adapted to the growing of almost every farm crop of the temperature zone assured a dependable feed supply. The adaptability of alfalfa to the Newlands project and its large yields and high feeding value, which seems peculiar to high irrigated sections, gave extra assurance that dairying could be made one of the most extensive and profitable industries of the project. Definite efforts were made toward the advancement of dairying on the Newlands project in 1914, when the Office of Demonstrations on Reclamation Projects was created for the purpose of advancing the agricultural industries on the various Reclamation projects.

The early development of dairying on the project was slow, owing to lack of capital for the purchase of foundation stock. An occasional year of high prices for alfalfa hay also had the effect of hindering

the steady increase in dairy cattle. The developed resources of the project, however, have provided funds for a substantial increase in the dairy population and experience has taught the ranchers that attractive prices for alfalfa hay to be shipped out of the project are less dependable than the market provided by a good herd of dairy cattle.

70 PER CENT OF PROJECT FARMERS DAIRYMEN.

The foundation period of dairy development of the Newlands project may be said to cover the past eight years. There is every indication that this locality will make rapid advancement as a dairy community and that our present stage of development will be considered small as compared with the future dairy industry of the project.

After these few years of dairying approximately 70 per cent of the farmers of the project may be said to be engaged in the dairy business on a commercial scale. The dairy herds as a whole do not average large in number. Seventy herds now on test average

15 producing cows per herd. This number includes a large number of small foundation herds, which will eventually be increased to herds of sufficient size to consume all the alfalfa produced on the respective ranches. The older established dairy herds number from 25 to 100 animals. The animals of each herd invariably represent one particular breed, which may be taken to indicate that considerable advancement has already been made in the dairy industry.

GOOD BULLS A BIG FACTOR.

Scrub bulls are conspicuous for their absence, which promises much for rapid advancement in herd improvement. From the time that dairy development work was begun on the Newlands project by the Office of Demonstrations, special emphasis has been laid on the importance of high-class bulls. Every effort has been made to maintain a minimum butter-fat requirement of 500 pounds for dairy herd bulls imported into this valley to be used on grade herds, and it is very gratifying to know that a large number of bulls with much higher records have been in use on the project. The offspring of these sires promise much toward making a permanent and profitable dairy industry on the project. At the present time most of the dairy herds are headed by a registered dairy sire of the breed predominating in the herd. The project is very fortunate to have registered dairy herds now of the very best breeding. These herds are supplying most of the bulls for project farmers.

FIVE YEARS SHOW MARKED INCREASE IN THE EFFICIENCY OF DAIRY COWS.

Dating from the year 1917, dairy-herd testing has been given especial attention. In June of that year 500 dairy cows on test showed an average monthly production of 628.74 pounds of milk and 24.71 pounds of butter fat per cow. At that time only seven of these herds exceeded in production an average of 30 pounds of butter fat for the month. The average production in June, five years later, of 934 cows on test showed an average increase of 166 pounds of milk and 6.36 pounds of butter fat per cow for the month over what it was in June, 1917. These figures give us a fair idea of what has been accomplished in the way of increased dairy production during the past five years.

DAIRY-HERD TESTING INDICATES LOW PRODUCTION COST ON PROJECT.

Dairy-herd testing work has been carried on extensively on the Newlands project under the supervision of the United States Department of Agriculture during the past year. The data secured have served to show that dairy products are produced very economically and that the dairy industry should serve as one of the principal sources of income.

During the past nine months of herd-testing work there has been an average of 758 cows on test each month. The average monthly production of these cows was 735 pounds of milk and 29.4 pounds of butterfat. When it is considered that three of the most favorable months locally of the year, namely, July, August, and September, are not included in this report, the full year's record should show an even better production, owing to the fact that during these months omitted in the report there is an abundance of new alfalfa hay.

Up to the present time (1923) the feeding of a straight alfalfa hay ration without limit is universally practiced. An allowance of 1,000 to 1,100 pounds of alfalfa hay per month is considered ample for the average-size producing cow on the project. After charging this amount of hay to each producing animal represented in the herd-testing operations and charging an additional amount of hay also to make up for what the dry cows of the herd consume, it is found that 1,140 pounds of milk, or 46.4 pounds of butter fat, were produced by 1 ton of alfalfa hay. In other words, it required 43.4 pounds of hay to produce 1 pound of butter fat by these dairy herds on test.

At the average prevailing price of butter fat locally during the year 1922 the gross returns for butter fat, together with the value of skim milk, were \$22.61 for each ton of hay consumed by these dairy herds on test.

PERMANENCY OF DAIRYING ASSURED.

The permanency of any industry in a community depends on its profitable returns. The rapid increase in dairying on the Newlands project is due to the fact that the dairy cow has been a dependable source of income, converting the cheap alfalfa hay into dairy products that make the returns per acre approximately three times the amount secured by marketing the hay direct. An abundance of cheap nutritious feed and favorable climatic conditions which reduce the cost of producing dairy products to the minimum give ample assurance that the Newlands project has possibilities of becoming a highly specialized dairy community.

Interests of Settlers and Government Are One.

"No sweeping changes in personnel are contemplated in the Bureau of Reclamation," announced Secretary of the Interior Work prior to leaving Washington on his trip with President Harding.

"We are going to put this branch of the Interior Department on a business basis and operate it in the interest of the settlers on reclamation projects as well as for the protection of the Government. That's all there is to it.

"Only through a recognition of the fact that the interests of both are one can the future success of reclamation projects be assured."

PRACTICAL SUGGESTIONS FOR POULTRY FARMERS.

By H. O. Numbers, Secretary Pennsylvania Poultry Association, Loretto, Pa.

ONE of the most ruinous agencies incidental to the destruction of poultry profits is lice. During the months of July and August these parasites make their deadly inroads on young and old chickens. In order that you may fully appreciate the detrimental effects on your flock you should know something about these pests.

Bird lice are wingless parasitic insects with mouths adapted to biting, not sucking. Lice in general infest the host bird permanently, except when moving to other individuals. Migration takes place on the roost, the nest, or while a hen is hovering chicks. Lice feed on epidermal products, such as feathers, scales, and skin itself. Excessive infestation is a serious hindrance to normal growth and development. The mortality in young chickens during the warm months is often traceable to lice. Egg production will be greatly diminished by excess infestation of the laying hen. There are more than 40 species of lice on domestic birds, but there are only 7 species found on the domestic hens in the United States. This is quite enough, when we consider the discomfort that one louse will cause a human being. The terms of head louse, body louse, wing louse, etc., as applied to the lice of fowls indicate where the various species are found in greatest numbers and where their structure best adapts them to live. Some lice live on the skin; others occur on the feathers as much as an inch from the skin. Lice generally spend their whole life on one host. Some lice hatch in four or five days, and reach the adult stage in 17 to 20 days. They are quite prolific, and if undisturbed will multiply in unbelievable quantities.

Symptoms of lice on growing chicks are easily discernible. When the chicks show a tendency to droop and drag their wings it is time remedial action is taken. Often the feathers become lacy and do not develop. Head lice are deadly, as they crawl in the ears. Body lice cause severe itching and irritation.

In the case of lice on chicks, the best remedy is individual treatment. Dust them well with a good commercial louse powder. Put all the coops in a sanitary condition. Kerosene is the most economical as well as effective insecticide.

Where laying hens or matured stock are affected the best wholesale method of ridding the pests is to make a suitable sand bath, as follows: For every 50 birds the bath should be 6 feet square. Use boards 6 inches wide. It is merely a frame 6 inches deep and 6 feet square. Fill with clean sand. Good road dust can not be excelled. The hens will dust them-

selves and get rid of all body lice. If the hens are infested with head lice, use powdered sodium fluorid. A pinch of this on the back of the head will be effective. Sodium fluorid is slow in action, but in four or five days all lice will be extinct. If hens have access to clean sand—and all henneries should be equipped with a suitable sand bath—they will not get lousy.

Another common pest in summer or in warm climates is the perch louse, or red mite. This insect is a blood sucker and feeds on the host at night while it is on the perch. After satisfying their appetites they retire to the crevices on the perch or under the filth which accumulates on the perches. This form of pest weakens the fowls and robs them of vigor and health. Paint the perch poles with kerosene. This will not only kill the adults but will also kill the eggs or nits which have been laid.

Insanitary conditions are unpardonable and unforgivable. Most of our poultry diseases are directly traceable to careless cleaning. If you are too busy to properly care for your birds, for your own sake and for the sake of the buying public get rid of your birds. The well-kept and orderly poultry yard is indicative of good management and profits. A fallacy exists that any old thing or place is good enough for chickens. It is not. Never was and never will be. If we will practice sanitation and hygiene in other pursuits, the poultry industry claims the greatest share. The egg is merely the finished product of the raw material given the hen. Can refuse and filth go to make a product that is suited for the invalid, the child, or the healthy person? Assume that clean, wholesome raw materials have been supplied the hen. The egg is porous and will absorb from filth as well as sanitary environment. Can an egg be fit to eat that lies around dirty nests or in an atmosphere that is repulsive to the buying public? Millions of eggs are being "put down in preservatives" during the hot weather while they are cheap. Are you one who is selling germs and bacteria to be stored away for future use?

For every dollar invested in the Arizona campaign for prairie-dog eradication in 1922 there was a \$15 return in the value of farm products saved from destruction by these pests.

The longer a calf is allowed to nurse the cow the harder it will be to teach it to drink from a pail.

PUMPING FOR IRRIGATION.

By L. N. McClellan, Engineer, Bureau of Reclamation.

FREQUENTLY, in connection with irrigation projects, areas of excellent land are situated too high to be reached by the gravity canal systems and must depend upon pumping for their water supply. In other cases the topography may be such that gravity diversions are impracticable, and the entire water supply is pumped directly from the stream or other source. The underground sources are often utilized for irrigation, the water being secured by pumping from wells. Pumping is also often necessary in connection with the drainage of irrigated lands. Hence pumping has considerable importance in connection with irrigation work, and this importance is increasing more and more as the construction of the more difficult projects is undertaken. For instance, the Yuma auxiliary project when fully developed is planned to contain approximately 45,000 acres, the water supply for which is to be pumped by four electrically operated pumping plants; the Hillcrest division of the Boise project, comprising some 14,000 acres, would be served by a large pumping plant, and the proposed North Side pumping division of the Minidoka project would have something over 100,000 acres served entirely by pumping plants.

The maximum height that water can be pumped economically depends on the cost of power, and especially on the value of the crops produced. Pumping lift of 200 or 250 feet may be feasible where valuable fruit crops are cultivated, whereas a 50-foot lift may be prohibitive where only grain, hay, and kindred crops are grown.

CENTRIFUGAL PUMPS.

The centrifugal type of pump is used almost entirely for irrigation pumping, as this type is simple in construction, having only one moving part, is reliable in operation, and comparatively cheap in cost. It is well suited for direct connection to electric motor or steam turbine, and the absence of valves permits the handling of water containing silt, leaves, etc., without serious trouble.

The single-stage pump is ordinarily used for heads up to 125 or 150 feet, and for the higher heads two or more stages are required. Centrifugal pumps may be of either the single or double suction type, depending on whether the water enters the impeller from one or both sides. The double-suction pump is somewhat more expensive, but has the advantage of being balanced hydraulically. The impellers are usually of the closed type, as the efficiency of this type is generally higher than can be secured with the open

type. The latter are sometimes preferred, however, where the water contains solid material which might clog the passages of an impeller of the closed type. The casings of the better class of pumps are split along the horizontal center line for convenience in repairing and inspecting the internal parts. This arrangement allows the top half of the casing to be removed without disturbing the bearings and piping connections. Pumps should always be provided with easily renewable clearance rings where there are close-running joints between the impeller and the casing, and renewable sleeves on the shaft where it passes through the stuffing boxes are desirable.

A centrifugal pump is not self-priming, and the casing must be filled with water before the pump will function. Sometimes vertical pumps are placed so that the casings are entirely submerged, which eliminates the necessity of priming. In the usual installation, however, the pump is placed above water and arrangements are made for priming. One method of accomplishing this is to place a foot valve on the lower end of the suction pipe, which automatically closes when the pump is stopped and keeps the casing full of water. This is used only on low-head, small-capacity installations, where water-hammer effects are unimportant, and even then it is not a very satisfactory arrangement, as the valve is subject to leakage if solid matter lodges between the seat and the leaf. Another arrangement is to have a valve on the discharge side of the pump which can be closed, after which the air can be exhausted from the pump by means of a vacuum pump or air ejector.

The maximum permissible suction lift depends on the temperature of the water, the altitude, and the velocity in the pump suction. Wherever possible, the pump should be placed so that the suction lift will not exceed 15 feet. The curves in Figure 1 show the maximum practical suction lifts for various temperatures and altitudes and for ordinary velocities in the suction line. Air leaks on the suction side of a centrifugal pump are one of the most common causes of unsatisfactory and inefficient operation, and care should be taken to see that the suction is airtight. Friction losses in suction and discharge pipe should be reduced as far as practicable by avoiding sharp bends and high velocities and by using gradual taper transitions wherever changes in area are necessary.

Efficiencies of over 80 per cent are not difficult to secure, but maximum efficiency can be obtained only when the pump is designed for the exact head, quantity, and speed under which it is to operate. The

head that the pump is designed for must, of course, be the total head, which includes the static lift and all friction and other losses in the suction and discharge lines. The speed is especially important where direct-connected electric-motor drive is used, as the speed of the motor is definitely fixed and the pump must be designed to suit this speed. In the case of belt drive, the proper speed can be obtained by selecting suitable pulleys. The proper speed of a pump for any particular head is fixed by the design of the pump, and if it becomes necessary to operate the pump under a different head, a corresponding change in speed should be made. Changing the speed of a centrifugal pump changes the capacity, head, and horsepower, as shown by the following equations:

$$\frac{N_1}{N_2} = \frac{Q_1}{Q_2} = \sqrt{\frac{H_1}{H_2}} = \sqrt[3]{\frac{Hp_1}{Hp_2}}$$

where N=revolutions per minute, Q=quantity delivered, H=head, and Hp=brake horsepower required to drive the pump.

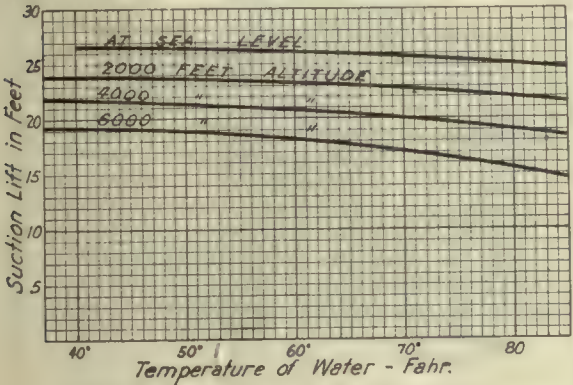


Fig. 1.—Maximum practical suction lifts.

The B Lift plant on the Yuma auxillary project is a typical example of a large-capacity, medium-head pumping installation. When completed this plant will serve approximately 18,500 acres of citrus land situated on the mesa adjacent to the Yuma project, but at too high an elevation to be reached by gravity from the canal system of this project. The plant is designed for three pumping units of equal capacity, each consisting of a 36-inch, vertical, centrifugal pump of 65 second-feet capacity, direct connected to a 700-horsepower, 2,200-volt synchronous motor. One of these units is now installed, and additional units will be added as required to meet the demand for water. The total head under which the pumps operate, including friction and losses, is 70 feet. A field test of the first unit showed a pump efficiency of 83 per cent at rated discharge. The three units discharge through a monolithic, reinforced-concrete pressure pipe, which is 72 inches in diameter and 1,150 feet in length. A

flap valve is installed at the upper end of this pipe, which prevents water from the upper canal from running back down the pipe when the pumps are stopped. An outdoor transformer station reduces the voltage from 33,000, at which voltage the power for operating the plant is received, down to 2,200. The equipment of this station consists of four 333-kv-a., single-phase, self-cooled transformers, three of which are connected in a bank and the fourth is a spare unit; an automatic oil circuit breaker between the transformers and the 33,000-volt bus; an air-break, pole-top switch; electrolytic lightning arrester, and choke coils on the incoming 33,000-volt line. The building is a reinforced-concrete structure, 22 feet wide by 80 feet long, which houses the 2,200-volt switching equipment and station auxiliaries, consisting of motor-generator exciter set, air-compressor, and vacuum pumps used for priming the main pumps. The building also contains a 15-ton, hand-operated traveling crane. A cross-section of the plant is shown in Figure 2.

Power for operating this plant is now being purchased from the Yuma Ice, Electric & Manufacturing Co., Arizona distributors for the Southern Sierras Power Co. of California, the rates being as follows: \$2 per month per horsepower of maximum demand plus an energy charge of \$0.02 per kilowatt-hour. Should the All-American Canal be constructed for supplying water to the Imperial Valley, power sites will be created; and it is proposed to develop this power for use in operating the pumping plants on the Yuma project. The construction costs of this plant, with building and discharge pipe, complete, but with only one pumping unit and one bank of step-down transformers installed, are as follows:

Substructure	\$11,094.17
Superstructure	26,230.05
Grounds and transformer yard	2,136.98
Machinery	53,353.74
Discharge pipe	26,378.05
Camp maintenance	4,393.20
Engineering and inspection	12,548.11
Total field cost	136,134.30
General expense	19,173.79
Grand total	155,308.09

A temporary pumping unit, consisting of a 16-inch horizontal, centrifugal pump, direct connected to a 200-horsepower induction motor, was installed for the purpose of supplying the water required during the early development period of the Yuma mesa and to save paying the demand charge on the 700-horsepower motor of the permanent unit. The cost of this temporary unit is included in the above machinery item.

PUMPING FROM WELLS.

In certain localities, which are underlaid with extensive and porous water-bearing formations, water in sufficient quantity for irrigation can be obtained

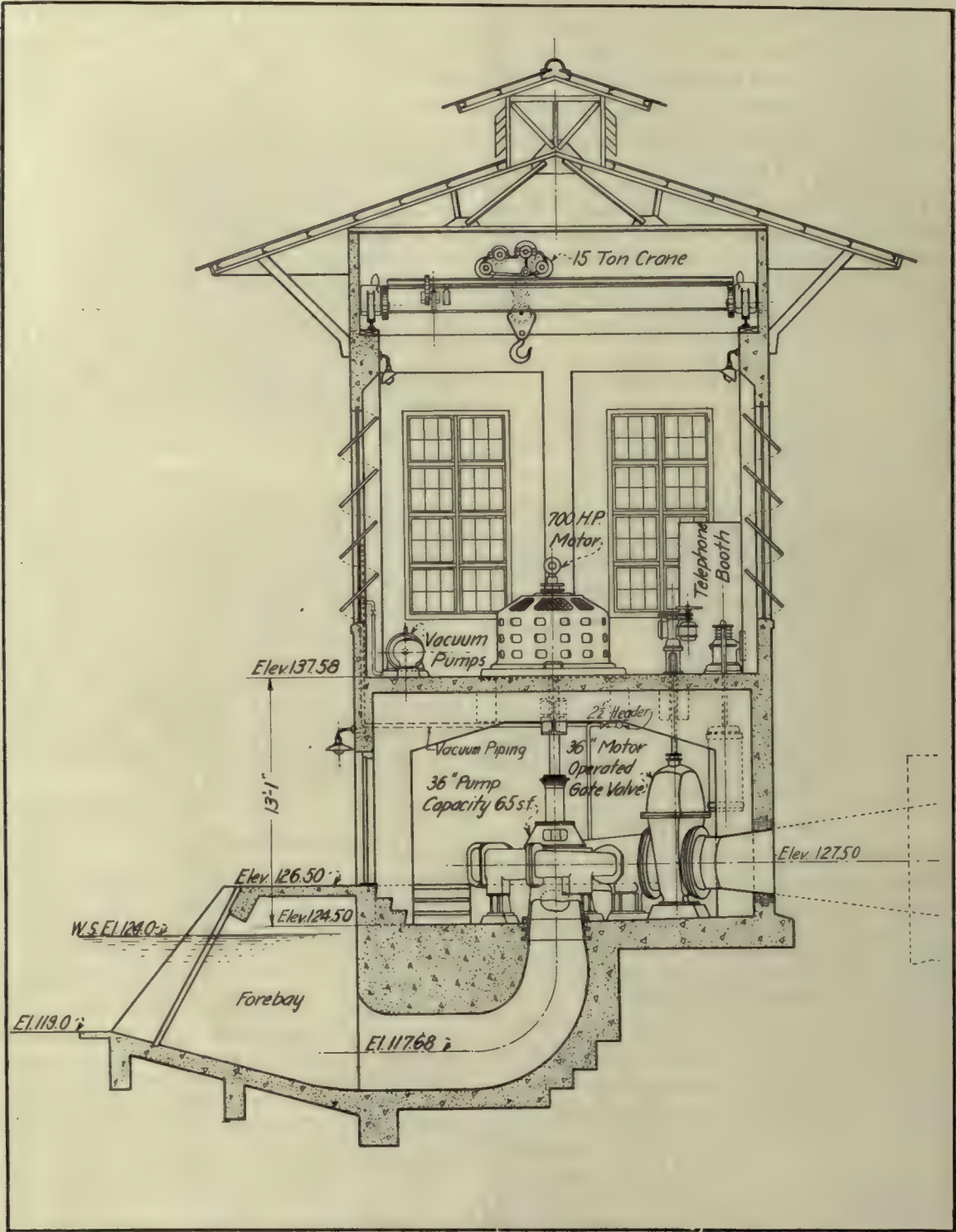


FIG. 2.—Cross section of B lift pumping plant, Yuma auxiliary project, Arizona.

by pumping. These underground sources are not inexhaustible, however, and the extent to which they can be drawn upon depends upon the total water supply available for replenishing that removed by pumping and upon the rate at which this supply moves toward the point of removal. Both the open-pit and the drilled types of wells are used in irrigation work, the former being used only where the water-bearing material is relatively close to the surface, and the latter to penetrate the deep underlying strata. A combination of the two is sometimes used, in which the open pit, excavated down to the water table, allows the pump to be installed within easy suction distance of the water surface, and one or more drilled wells extend on down below the bottom of the pit, which serve to tap the deep water-bearing strata. The principal advantage of the open-pit type of well is that it permits the use of a standard centrifugal pump. The shallower wells of this type are usually made large enough to accommodate a horizontal pump. For the deeper pits the vertical-shaft centrifugal pump is used, as the additional cost of this type of pump is offset by the saving in pit excavation, and, in addition, the vertical unit has the advantage of placing the motor, if electric drive is used, high enough to avoid danger of damage from a rising water table; or, if belt drive is used, the belt and driving head can be placed above ground. Vertical pumps can be placed so that the casing is submerged in order to make the pump self-priming.

Drilled wells vary in size from 4 to 30 inches in diameter and can be drilled as deep as may be required to reach the deep strata of water-bearing material. They must be protected from cave-in by some form of casing. Light-weight, lap-welded, screw-joint pipe is usually used for casing the small-diameter wells, whereas California, or "stovepipe" casing is frequently used on wells 10 inches and larger in diameter. This latter consists of a double shell made up of 2-foot lengths of No. 12 gauge sheet steel with riveted longitudinal seams. The joints between the sections of the outer shell are staggered midway between those of the inside shell, forming a continuous casing which is smooth both inside and out. The casing must be perforated at each stratum of water-bearing material. The life of a good heavy steel casing is ordinarily great, but under certain conditions rapid corrosion occurs, owing to chemical action. In such cases concrete casing can be used advantageously.

The deep-well turbine pump is most commonly used for pumping large quantities from deep wells. This is a special form of centrifugal pump designed for installation in drilled wells 10 to 30 inches in diameter. The pumps operate submerged and do not require priming. The weight of the rotating parts is carried by a thrust bearing located in the driving head at the upper end of the pump column, and the shaft and

bearings should be incased to prevent water and sand from coming in contact with them. The following table shows approximately the capacity of deep-well turbine pumps that can be installed in wells of various diameters:

Diameter of well.	Pump capacity.
Inches.	Gallons per minute.
10	180-450
12	1,000
14	1,300
16	1,500
18	1,800
24	4,000
30	4,500

Efficiencies of over 70 per cent can be secured with properly designed deep-well turbine pumps.



Forebay side of B lift pumping plant, Yuma auxiliary project, Arizona.

In order to obtain a large yield from a drilled well, it is necessary for it to penetrate an extensive bed of coarse material, and the size or form of construction has small effect, except that large pumps are required for large yields, and these in turn require large-diameter wells. The yield is a question of the flow of the ground water and of the area made tributary to the well by the depression of the water level in the well. The yield of a deep well is approximately proportional to the draw down.

The Dutch Flats drainage pumping plants on the North Platte project are examples of deep-well pumping installations. There are three of these plants, each consisting of a deep-well turbine pump installed in an 18-inch well, which is cased with concrete casing. The pumps are driven by direct-connected vertical induction motors. Each well has a 12 by 12 foot metal lath and plaster building equipped with I-beam trolley hoist for handling the pump and motor. One of the wells has a 4-second-foot pump

driven by a 30-horsepower motor, and the other two have 2-second-foot pumps driven by 20-horsepower motors. The average depth of the wells is 57 feet. The three pumping plants, complete, cost \$34,000. Details of the construction of these plants are shown in Figure 3.

AIR LIFT.

The air lift is sometimes used for pumping from deep wells. It consists of a riser or delivery pipe suspended in the well, with from 40 to 65 per cent of its length submerged, and a second pipe which supplies compressed air at the lower end of the delivery pipe. The compressed air bubbles up through the water in the delivery pipe, forming a mixture of air and water, which is lighter than the column of solid water on the outside of the delivery pipe, and which therefore rises until discharge takes place at the upper end of the delivery pipe. The over-all efficiency of the air lift is relatively low, varying from 20 to 50 per cent, but this low efficiency is offset to some extent by the advantage of having no moving parts under water and all of the operating mechanism above ground, and also by the fact that considerable quantities of sand can be pumped without damage to the equipment. Where a number of wells are closely grouped and can be supplied with air from a central compressor plant the air lift has been found to be a satisfactory installation.

DIRECT PUMPING.

Frequently in connection with a gravity irrigation project water is dropped from one canal to another at a lower elevation, and the power thus available may be utilized to pump water to lands situated above the upper canal which can not be served by the gravity system. For this purpose direct pumping units are used, which consist of a centrifugal pump direct connected to a hydraulic turbine, with both pump and turbine receiving water from a common penstock. Efficiencies of 55 to 68 per cent have been secured with these units, and the manufacturers have guaranteed an efficiency of 70 per cent for the two direct-pumping units recently purchased for the Black Canyon pumping plant, Boise project, Idaho. The turbines of these units will operate under an effective head of 89 feet and will have a capacity of 550 horsepower. The pumps will each have a capacity of 133 second-feet when pumping against a head of 28.5 feet.

Direct pumping units are very reliable in operation and can be operated satisfactorily without close attendance. The smaller plants of this type are customarily operated by a ditch rider, who visits the plant once or twice a day to regulate the quantity of water pumped and to inspect the bearings.

A combination of the air lift and hydraulic compressor has been suggested for direct pumping pur-

poses, and such a combination would have the advantage of no moving parts. The efficiency, however, would probably be low, and considerable development work would be required before a practical installation could be attempted.

SCREW PUMPS AND SCOOP WHEELS.

The screw or propeller type of pump is especially suited for pumping large quantities against low heads. It consists essentially of a cylindrical casing, containing a revolving propeller discharging axially through the pump. The efficiency of this type of pump is higher than the centrifugal pump for heads of less than 10 feet. The screw pump has a much higher speed than the centrifugal pump, which is an advantage for low heads where the pump is to be direct connected to the prime mover. It has the further advantage of maintaining high efficiency over a wide range in head. The following table shows approximately the relative efficiencies of the screw and centrifugal type of pumps for heads up to 10 feet:

Head.	Centrifugal pump.	Screw pump.
<i>Feet.</i>	<i>Per cent.</i>	<i>Per cent.</i>
2	20	80
4	38	70
6	55	76
8	67	78
10	75	75

The Valley Drainage pumping plant on the Yuma project is a typical example of a screw-pump installation. This plant contains one 36-inch screw pump direct connected to a 100-horsepower, semi-Diesel oil engine, and one 30-inch screw pump direct connected to a 75 horsepower, semi-Diesel oil engine. The plant pumps drainage water from approximately 50,000 acres through the levee into the Colorado River. At normal stages of the river the head under which the pumps operate is about 9.25 feet, but when the river is in flood stage the pumping head is increased to 14 or 16 feet. This plant, with building completed for four units, but with only two units installed, cost \$136,624. The engines are operated on 24° to 27° Baumé gravity California crude oil. The average consumption of fuel oil for the calendar year 1922 was 0.16 gallon per foot-acre-foot, and the total operating cost at this plant for 1922 averaged \$0.045 per foot-acre-foot, not including depreciation. A third unit, consisting of a 36-inch screw pump direct connected to a two-speed, 100/250-horsepower electric motor, is now being installed, and the 75-horsepower oil engine is being replaced by a 75/175-horsepower two-speed motor. These units will be operated at the slower speed for the normal head, and the higher speed will be used only when the head is high, during the flood stage of the Colorado River. The motors will be equipped with automatic starters, which will be controlled by

float switches. This arrangement will permit this plant to operate automatically, the units starting successively as the water reaches a certain height in the drain and stopping when the water is pumped down to some predetermined elevation.

Scoop wheels have been used to pump small amounts against low heads; and, where the head is constant, efficiencies of about 60 per cent are secured. They are not suited for variable head conditions. They consist of a large paddle wheel operating in a curved flume, the sides and bottom of which closely fit the paddles of the wheel. Essentially, it is a power-driven undershot waterwheel.

SOURCE OF POWER.

Electric power is generally used for operating irrigation pumping plants wherever it is available at reasonable rates, since it has many advantages over other forms of power. The electric motor is well suited for direct connection to centrifugal pumps, is lower in first cost, has a lower rate of depreciation, requires less attendance and less space, and is simpler and more reliable than any other form of drive. The speed of an electric motor is definitely fixed, and where pump and motor are to be direct connected the pump must be designed to operate at the motor speed. Two-speed motors are sometimes used where a wide variation in head exists.

Gasoline engines are the favorite for operating small isolated plants in localities where electric power is not available. These engines are low in first cost, reliable in operation, require only a small amount of attendance, and are economical to operate, delivering from 8 to 10 horsepower-hours per gallon of fuel. Semi-Diesel and full-Diesel engines are occasionally used for the larger isolated plants. They are considerably more expensive to install, but are more economical in fuel consumption than the gasoline engine. The semi-Diesel will deliver from 10 to 12 horsepower-hours and the full-Diesel from 15 to 19 horsepower-hours per gallon of fuel.

Steam power is used in some cases, but it is economical only for very large plants, as elaborate provisions for fuel economy and continuous attendance are required.

The accompanying table shows data concerning the pumping plants on the various projects which are operated by the Bureau of Reclamation. Several others have been constructed by this bureau, but are now operated by irrigation districts or water users' associations. The total capacity of pumping plants which are being operated on projects constructed by the Bureau of Reclamation is something over 2,700 second-feet and over 14,000 horsepower is required for their operation.

Pumping plants operated by the Bureau of Reclamation, calendar year 1922.

Project.	Name of plant.	Type of pump.	Type of drive.	Number of units.	Net lift.	Installed capacity.		First cost of plant.	Cost of operation, calendar year 1922.	Electric energy used, 1922.	Cost of electric energy or oil, 1922.	Acre-feet pumped, calendar year 1922.	Cost per foot-acre-foot pumped without depreciation.
						Second-feet.	Horsepower.						
Grand Valley.	Price-Stub....	Vertical-centrifugal.	Hydraulic turbine.	1	Feet. 31.0	28	125	\$46,697.83	\$1,217.19			6,670	\$0.006
Huntley.....	Ballantine....	do.....	do.....	2	44.6	60	331	73,833.32	2,314.48			9,540	.005
Do.....	Ballantine auxiliary.	Horizontal-centrifugal.	Semi-Diesel.	2	44.6	46	368	70,331.33	2,895.67	(1)	\$1,339.19	1,470	.044
Lower Yellow.	Thomas Point ²	do.....	Hydraulic turbine.	2	35.5	50	135	48,932.18					
Minidoka....	Pumping station No. 1.	Vertical-centrifugal.	Motor.....	5	29.5	725	2,760	182,920.77					
Do.....	Pumping station No. 2.	do.....	do.....	4	29.76	620	2,400	181,845.30	30,992.55	22,362,446	11,119.14	190,862	.00232
Do.....	Pumping station No. 3.	do.....	do.....	3	29.38	430	1,560	101,395.64					
North Dakota.	Pumping station No. 1.	Horizontal-centrifugal.	Steam turbine.	3	51.0	65	490	8,821.00	6,975.83	138,850	6,975.83	1,090	.126
Do.....	Pumping station No. 2.	do.....	Motor.....	2	27.4	35	175	14,065.00	2,837.52	46,300	2,328.83	671	.154
Do.....	Pumping station No. 3.	do.....	do.....	3	24.8	90	405	39,647.00	10,499.25	173,500	8,718.86	1,942	.218
Do.....	Pumping station No. 4.	do.....	do.....	1	27.3	20	100	8,821.00	1,664.59	26,100	1,310.92	362	.168
North Platte..	Dutch Flat wells.	Deep well turbine.	do.....	3	30-52	8	70	33,997.83	5,577.79	232,200	4,548.00	1,252.8	.112
Okanogan....	Robinson Flat	Horizontal-centrifugal.	do.....	2	188	12	200	30,077.24	10,678.86	665,392	7,411.09	1,197.9	.048
Do.....	Duck Lake....	do.....	do.....	1	60	5	50	14,264.95	1,874.72	91,463	1,216.35	1,065	.031
Do.....	Government wells.	Vertical-centrifugal.	do.....	2	45	2	30	18,852.34	1,198.42	50,773	128.25	297	.115
Yuma.....	B Lift ³	do.....	do.....	1	69	65	700	155,302.84					
Do.....	B Lift.....	Horizontal-centrifugal.	do.....	1	69	20	200	(1)	8,190.42	181,900	6,058.00	1,187.6	.10
Do.....	Valley drainage.	Horizontal screw.	Semi-Diesel engine.	2	9-14	75	175	130,751.12	16,122.39	(5)	4,154.09	2,442.4	.046

¹ 8,891 gallons of oil used in 1922.

² Operated intermittently only during 1922.

³ Operated for test only during 1922.

⁴ Included in above.

⁵ 55,219 gallons of oil used in 1922.

DRAG-LINE EXCAVATOR OPERATION, NORTH PLATTE PROJECT, NEBRASKA-WYOMING.

By L. G. Cairns, Superintendent of Construction.

THE Interior Department is carrying on extensive construction work on the North Platte irrigation project in the States of Nebraska and Wyoming in connection with excavation of canal and drainage systems, and has excavated to date over 30,000,000 cubic yards of material. During 1922 over 2,500,000 cubic yards of material have been moved in connection with this work. The amount of material excavated on the North Platte project is greater by 10,000,000 cubic yards than that excavated on any other project of the Bureau of Reclamation.

In connection with this work a large number of electric drag-line excavators are in operation, and in cooperation with the manufacturers there have been perfected types of excavating machines with which the department has been able to make records of economy and efficiency that may be of interest to readers of the RECLAMATION RECORD.

Machine No. 43, a class 9½ electric drag line, excavated between July 8, 1919, and June 24, 1922, approximately 1,300,000 cubic yards of material, of which 17 per cent was class 2. The machine was operated continuously two shifts per day except when temporarily delayed by storms or other causes for which the machine was not responsible without losing two consecutive shifts on account of repairs.

Two class 9½ electric drag lines, Nos. 12 and 43, working two shifts per day on the Fort Laramie main canal, excavated 790,747 cubic yards, of which 24 per cent was class 2 material which required blasting. The average excavation per machine per month was 42,900 cubic yards. The average per shift, including repair shifts, was 805 cubic yards. In addition to the 790,747 cubic yards, there were rehandled 25,270 cubic yards on account of very heavy cuts.

During the month of June, 1922, the record for the two above-mentioned machines working two shifts per day was as shown in the accompanying table.

During August, 1921, five class 9½ electric drag lines on a two-shift basis excavated 212,643 cubic yards, or an average of 42,500 cubic yards per machine.

In December, 1921, four class 9½ electric drag lines working two shifts per day excavated 174,060 cubic yards, or an average of 43,500 cubic yards per machine.

The average excavation per machine per month of the class 9½ electric drag lines on the Fort Laramie division, working two shifts per day, was 33,600 cubic yards for the 152.5 machine months.

Electric drag line operation, June, 1922.

Item.	No. 12. ¹	No. 43. ²
Excavation, class 1, cubic yards.....	48,060	52,393
Excavation, class 2, cubic yards.....	11,276	10,435
Total.....	59,336	62,828
Number of shifts, including Sunday repairs.....	56½	57
Average cubic yards per shift.....	1,043	1,104
Number of shifts, digging time.....	52	50
Average cubic yards per shift.....	1,140	1,256
Cubic yards per hour, digging time.....	165	182
High run in 8 hours, cubic yards.....	1,867	1,896
High run in 16 hours, cubic yards.....	3,422	3,671
Linear feet of drain.....	5,477	6,260
Bottom width, feet.....	14	24
Depreciation, cost per cubic yard.....	\$0.0485	\$0.0478
Operating cost per cubic yard.....	.0245	.0274
Total field cost per cubic yard.....	.0730	.0752

¹ Chief operator, O. M. Stone; shift operator, A. D. Cummings.

² Chief operator, E. R. Laing; shift operator, Roy Skinner.

³ Both high runs made on June 21.

As an example of the adaptability of the drag-line excavators to other work, it is interesting to note that during the excavating of drains over which pile bridges were constructed the piles for bridges were driven by the drag-line excavators after excavation had been completed to the level at which the piles intersect the slope line. Adjustable leads were attached to the boom for driving these piles and this permitted their removal before moving to a new location without raising or lowering the boom. About five hours were lost from the excavation work in driving 8 or 10 piles, and the cost of labor, including car mileage, was about \$16.

Credit should be given to the following persons for development of this efficient type of excavator:

M. R. Taylor, master mechanic, to whom much credit is due for the efficient operation of the machines. He is an expert gas engine man and came to this project as chief operator and was later promoted to master mechanic.

Credit should also be given to Roy E. Stone, chief operator; Otto Rittenour, Cliff Richardson, Max Barrot, and G. J. Hertzler, operators.

G. R. Larsen, electrician, should be given credit in connection with the electrical installation; R. K. Schlosser, power house foreman; George Banning, foreman on transmission line; and F. S. Beach, foreman and powder man on blasting operations, deserve credit for efficient work in connection with their respective parts of the work.

NOTE.—During the month of May, 1923, a class 9½ electric drag line using a 1½ cubic yard bucket and

operating 3 shifts, excavated 117,413 cubic yards of practically all class 1 material at a field cost of 3½ cents per cubic yard; high run in 8 hours, 2,358 cubic yards; high run in 24 hours, 6,215 cubic yards; average per operating shift, 1,480 cubic yards; average per shift, including Sunday repairs, 1,358 cubic yards. In the period from May 21 to May 31 the machine excavated 46,155 cubic yards. The machine practically lost 3½ shifts moving to new work and crossing a canyon. E. R. Laing is the chief operator; Roy Skinner and Willard Reece are operators.

During the month of May 253,447 cubic yards were excavated by drag lines at a field cost of 5.6 cents per cubic yard.

DAMS CONSTRUCTED AND UNDER CONSTRUCTION BY THE BUREAU OF RECLAMATION.

The Bureau of Reclamation has six dams under construction at the present time, in addition to a large mileage of canals and drainage ditches, involving the excavation of 1,000,000 cubic yards of material per month. These six dams with their estimated volume and height are as follows:

Name.	State.	Estimated volume.	Height.
		Cubic yards.	Feet.
Tieton ¹	Washington.....	1,850,000	244
McKay.....	Oregon.....	2,300,000	159
Black Canyon.....	Idaho.....	74,500	153
Hubbart.....	Montana.....	16,000	104
Willwood.....	Wyoming.....	18,500	68
Wind River.....	Idaho.....	17,000	27

¹ The maximum height to the bottom of core wall is 321 feet.

"What have you done?" is often the test applied by administrators in looking for responsible persons to take charge of work or to accomplish certain results.

Tested by this rule, the list of dams constructed by the Bureau of Reclamation will be of interest. The bureau has built 3 dams over 300 feet high, 2 dams between 200 and 300 feet high, 4 dams between 100 and 200 feet high, and nearly a hundred dams ranging from about 2½ to nearly 100 feet in height.

The list of dams arranged in the order of height is as follows:

Dams constructed by the Bureau of Reclamation.

Name.	State.	Height.
Arrowrock.....	Idaho.....	349
Shoshone.....	Wyoming.....	328
Elephant Butte.....	New Mexico.....	306
Roosevelt.....	Arizona.....	280
Pathfinder.....	Wyoming.....	218
East Park.....	California.....	139
Sun River.....	Montana.....	132
Lahontan.....	Nevada.....	124
Belle Fourche.....	South Dakota.....	122
Cold Springs.....	Oregon.....	98
Minidoka.....	Idaho.....	86
Sherburne Lakes.....	Montana.....	85

Dams constructed by the Bureau of Reclamation—Con.

Name.	State.	Height.
Clear Creek.....	Washington.....	84
Strawberry.....	Utah.....	72
Lake Keechelus.....	Washington.....	70
Upper Deer Flat.....	Idaho.....	70
Willow Creek.....	Montana.....	70
Jackson Lake.....	Wyoming.....	67
Minatare.....	Nebraska.....	65
Concunully.....	Washington.....	64
Lake Kachess.....	Idaho.....	63
Lake McMillan.....	New Mexico.....	55
Avalon.....	Idaho.....	50
Ralston.....	Wyoming.....	50
Lake McDonald.....	Montana.....	48
Boise River.....	Idaho.....	45
Bumping Lake.....	Washington.....	45
East Park Feed Canal.....	California.....	44
Salmon Lake.....	Washington.....	42
Elephant Butte Dike.....	New Mexico.....	42
Lost River.....	Oregon.....	40
Lower Deer Flat.....	Idaho.....	40
Pathfinder Dike.....	Wyoming.....	40
Granite Reef.....	Arizona.....	38
Indian Creek Dike.....	Utah.....	37
Two Medicine.....	Montana.....	37
Vandala.....	Idaho.....	34
Clear Lake.....	California.....	33
Laguna.....	Arizona-California.....	30
Dam No. 1.....	Nebraska.....	30
South Pablo.....	Montana.....	30
Whalen.....	Wyoming.....	29
Nelson.....	Montana.....	28
Ninepipe.....	Idaho.....	25
North Pablo.....	Idaho.....	25
Camas A.....	Idaho.....	25
Dodson.....	Idaho.....	25
Dry Fork.....	Idaho.....	25
Three-Mile Falls.....	Oregon.....	24
Grand Valley.....	Colorado.....	24
Belle Fourche Diversion.....	South Dakota.....	23
Dam No. 14.....	Nebraska.....	23
Truckee.....	Nevada.....	22
Carson.....	Idaho.....	21
South Canal.....	California.....	20
Corbett.....	Wyoming.....	18
Percha.....	New Mexico.....	17
Indian Creek Crossing.....	Utah.....	17
Four Horns.....	Montana.....	17
Little Porcupine.....	Idaho.....	17
Mesilla.....	New Mexico.....	16.7
Deer Flat Forest.....	Idaho.....	16
Horte.....	Montana.....	16
Spanish Fork.....	Utah.....	16
Gunnison.....	Colorado.....	15½
Lower Lost River.....	Oregon.....	15
Blacktail.....	Montana.....	14
Lake Tahoe.....	Nevada.....	14
Crow Creek.....	Montana.....	13
Swift Current.....	Idaho.....	13
Power Canal.....	Arizona.....	12½
Point of Rocks.....	Montana.....	12½
Lower Yellowstone.....	Idaho.....	12
Middle Pablo.....	Idaho.....	12
Mud Creek.....	Idaho.....	12
Rating Flume.....	Utah.....	12
Cle Elum.....	Washington.....	11
Leasburg.....	New Mexico.....	10.8
Dry Creek.....	Montana.....	10
Joint Head.....	Arizona.....	10
Ironstone.....	Colorado.....	8½
Sunnyside.....	Washington.....	8½
Loutzenhizer.....	Colorado.....	8
Northside.....	California.....	8
Kickinghorse.....	Montana.....	7
East Canal.....	Colorado.....	6.8
Montrose and Delta.....	Idaho.....	6.8
Garnet.....	Idaho.....	6½
St. Mary.....	Montana.....	6½
Big Porcupine.....	Idaho.....	6
Selig.....	Colorado.....	6
Horse Creek Crossing.....	Utah.....	6
Strawberry Diversion.....	Idaho.....	6
Big Knife.....	Montana.....	5
Salmon Creek.....	Washington.....	4½
Little Porcupine.....	Montana.....	4
Poplar.....	Idaho.....	4
Mission Creek.....	Idaho.....	3
Tieton Diversion.....	Washington.....	3
Echo (Feed) Canal.....	Oregon.....	2½

PROJECT WOMEN AND THEIR INTERESTS.

By Mrs. Louella Littlepage.

THE community movement, which has become nation-wide, has at last permeated the Capital of the Nation and crystallized in a great meeting at the national baseball park a couple of weeks ago, when the school children of the District of Columbia serenaded the President and Mrs. Harding.

It was an impressive scene. A little canopy-covered, flower-bedecked platform had been erected on the diamond for the guests of honor. In every direction the Stars and Stripes gleamed against the summer sky. The grandstand was thronged with spectators, sections being roped off for officers and families of the Army and Navy.

The famous Marine Band and the Army and Navy bands were stationed at different points, and while they filled the air with music 8,000 children, carrying 8,000 garlands and bouquets, marched in and deposited the flowers at the base of the flags which were stuck in the ground at short intervals outlying the route over which the President's party reached the platform. The children then took up their places in the bleachers.

The President entered to strains of Hail to the Chief; the throngs sang community songs; the children sang and danced; and then, following "The Pied Piper," several hundred little children of pre-school age dressed all in white and carrying huge bouquets marched to the center of the field and deposited their offerings at the feet of the President and the first lady of the land.

The project papers contain many accounts of community work, and it is up to you, and you, and you to spread the good work until the community spirit is aroused on the last farm and in the last village on the Government projects. It is the first step toward world-wide peace.

Hermiston Celebrates May Day.

The Women's Community Club of Hermiston, Umatilla project, Oregon, recognizing the importance of children participating in festival work, staged a gorgeous spectacle on the school ground.

To pay expenses a voting contest for queen was held. Votes were sold at 1 cent each, and a keen and exciting contest resulted in Arloline Robinson being declared the winner. Only high-school students were eligible for election. For two weeks the women worked early and late on costumes and decorations, and for two weeks the children planned and drilled. The whole community caught the spirit and indi-

viduals vied with each other to make the affair a success. Improvised benches were prepared for the audience, and the platform provided for the queen and her retinue was a veritable bower. Flower-laden baskets hung from the trees, ropes of wisteria swung from bough to bough, and stately hollyhocks stood sentinel in the background.

The local band played, the chorus of high-school voices wakened joyful echoes. With pomp and ceremony Colonel McNaught, officiating as Archbishop of Canterbury, crowned the queen. Pupils from the various grades, costumed to represent flowers and brownies, gave dances and drills and paid homage to the queen.

The success of this festival presages an annual return of the celebration.

El Paso's Historical Pageant.

In celebrating its golden jubilee the city of El Paso staged an elaborate spectacular and educational pageant depicting the history of the Southwest for 900 years. One thousand persons were included in the cast, and throughout the 10 scenes, from the prologue to the grand finale, there ran a heart-gripping thread of romance.

When darkness dropped over the desert at the close of one of the most thrilling days El Paso ever experienced, the population had gathered in the great high-school stadium. As night blotted the city from view a stranger might have believed it still virgin country. Mellow lights suddenly illuminated the stadium. The Mexican City Band lent color to the delusion of romance. The soul of the Spanish adventurers of centuries ago permeated the scene, and the throngs of people who had assembled to witness the historic pageant of its development from desert waste to garden, from adobe huts to sky scrapers, became suddenly silent. Romance filled every mind. Unseen, El Paso the modern city was forgotten, and thoughts went back hundreds of years as a clumsy prairie schooner slowly made its way down the mountain side and rumbled into view. It halted and the settlers made camp, and the pioneers dreamed of the city that was to be. This was followed by a scene of the year 1400 when a peaceful Pueblo village was attacked by Apaches.

There followed rapidly the coming of the first white man, Cabeza de Vaca, who with his followers crossed the plains of Texas into Chihuahua. He was followed by hundreds of Indians, who worshiped him as the Sun God. That sturdy pioneer, Juan de

Onate, with his soldiers, settlers, servants, horses, and sheep, appeared and took possession of the Rio Grande Valley in the name of God and for Phillip II, King of Spain. Then were shown the Pueblo rebellion against the Spaniards; the old Spanish Trail, with soldiers, friars, and caravans of people traveling over it and constantly on the lookout for the alert Apache; the Ponce de Leon ranch house, with scores of beautiful Spanish dancing girls; Franklin, now El Paso, in 1849, with cowboys and cowgirls and the pony express; arrival of the first mail coach; the first meeting of the city council; the passing of the bad man, and finally the appearance of 30 horsemen in glittering armor and drawn swords, headed by a dozen trumpeters escorting Queen Nancy and her entire court from the throne across the arena.

After the playing of the Star Spangled Banner the Mexican City Band played the Mexican national hymn, an honor only tendered on occasions of state and equal to a 21-gun salute in the United States.

It was a lesson in history and patriotism which will never be forgotten by those who witnessed the spectacle or those who took part.

Biddy Saves the Day.

A mighty good argument for some poultry raising on every farm is furnished in an account of the comfort and financial security which were attained last year by a Colorado woman.

Their grain crop was almost a total failure, amounting to only 90 bushels of wheat and 30 of barley. Besides this they had only a small crop of corn, which was fed to the live stock. However, she had culled her flock, selling the culls for \$106. The eggs and chickens sold brought \$597.20, which was sufficient to pay the taxes, the interest on money borrowed for the farm, enlarge the poultry house, and finish the inside of two rooms, besides adding a new room to the tar-papered house. This enabled the family to have a cozy, warm, three-room house which was much more comfortable than the one room and lean-to kitchen they had formerly used.

Raises Baby Chicks.

Mrs. E. G. Chamberlain, of Nucla, Uncompahgre project, Colorado, has had so many orders for 30-day-old chicks this spring that she is considering embarking in the business extensively next season.

It all came about this way: Early in the spring a couple of agricultural workers holding a dairy meeting in Nucla were so impressed with the Rhode Island Red Chickens Mrs. Chamberlain had hatched that they ordered some of them. She was glad of the sale as she had been unable to dispose of her hatch. However, that shipment had not reached its destination in Montrose before she was besieged with orders for chickens from people who saw the ones on

the road, and she soon sold out, and has since disposed of all she has hatched out. She could have sold a thousand more had she had them. She plans next year to sell the chickens about 40 days old, as they will then be better able to stand the long, hard trips. One of the friers from her flock killed a few days ago weighed 2½ pounds.

Cows and Chickens Pay Operating Cost on Ranch.

Mrs. Kennedy, who lives on a ranch on the Minidoka project, Idaho, tells how their farm is operated by the revenue obtained from cows and chickens.

At this time the Kennedys have on hand about 320 laying hens, all White Leghorns. These run from one to three years of age, after which time she does not think it profitable to keep them. From these hens they market 110 dozen eggs a week. At the present low price this brings a weekly check of \$17.60, besides what they use in their own family.

In their dairy herd, Mrs. Kennedy says, they have seven cows, two Holsteins, and five Jerseys, two of the latter being registered. The gross receipts from the seven amount to \$3 per day, not including the milk consumed in the family and the soured milk which they feed to the chickens, this being no inconsiderable part of their daily ration. The sour milk makes a cheap feed, being a by-product of the dairy.

Mrs. Kennedy says these cows and chickens pay all the running expenses of their ranch, and she is enthusiastic over the opportunities offered by this combination business for any one operating it properly.

Now is the Time to Save Eggs.

The thrifty housewife at this season is thinking of ways to preserve eggs against the high prices that are bound to come next fall. Cold-storage methods are, of course, not available to the housewife, but there are three methods of preserving eggs which are available to all.

As only the freshest eggs should be preserved, it is necessary that they be candled. A simple home-made candler may be made from an ordinary shoe box. The source of light may be either a kerosene lamp or an electric light. With the box standing on end, cut a hole about 1½ inches in diameter at a point opposite the flame of the lamp. Another hole should be cut in the top to allow heated air to escape, or, with an electric light, to permit the wiring to come through. An elastic band or piece of string may be used to keep the cover in place, thus giving a solid box and a greater concentration of light upon the hole.

The freshness of an egg is determined by the size of the air space. An egg one day old has an air

space scarcely the size of a dime. Owing to the evaporation of water through the pores of the shell, the longer an egg is kept the larger the air space. Cracked eggs and shell weakness show clearly before the candle. Meat spots and blood spots appear as a dark or red spot floating around within the egg. Mold and rots are usually found in old eggs and can be very easily distinguished.

The methods of preserving with limewater and salt or with water glass have been previously printed in the RECORD.

The grease method of preserving eggs consists of rubbing some kind of grease over the shell, thus closing the pores and preventing evaporation. Commercial greases are proving the most satisfactory for this work. Most of them have for a base either paraffin or beeswax, but neither of these substances when used alone is highly efficient.

Greasing has the advantage in that it requires the minimum of space for preserved eggs. The method usually followed in greasing is to put a little grease in the palm of the hand and then rub it well over the eggs. When the eggs are greased they may be returned to the egg case and stored in a cool, dry place. The case should be turned over occasionally to prevent the yolk from sticking to the shell.

Properly preserved eggs can be used safely for both cooking and eating. Do not wash the eggs, but be sure to use only clean ones.

Effective Work on the Rio Grande Project.

Down on the Rio Grande project, New Mexico, the women have been making a delicious cantaloupe marmalade for home use from ripe fruit which can not be marketed. They also make cantaloupes into preserves. Kieffer pears, which are not easily marketable, are also put up in various forms for home use, pear honey, preserves, and marmalade, also spiced and sweet pickles, being the most common forms.

Extension work has touched many kinds of home activities in this section and achieved profitable results. A homemade shower bath, widely copied and used, is made out of an old milk pail. The total cost was \$1.28. A hole 3 inches in diameter was made in the bottom, a 15-cent funnel was soldered over the hole, and a 6-foot rubber hose and spray nozzle, purchased for \$1.13, was attached to the spout of the funnel. This bath was hung from the ceiling by a rope and pulleys. This proved a very satisfactory shower in rural homes that had no water system.

An effective detail in a child-welfare campaign carried on in that section was the making of a baby fly screen. A frame was made from one-half of a barrel hoop at each end with two 1-inch strips between. This frame was covered with cotton mosquito netting. When completed the screen could be placed over the baby

on the bed or floor. The cost was 25 cents. This is a handy article to carry on picnics or any place away from home if made collapsible.

An effort to stimulate goat-milk feeding for undernourished children was another child-welfare project, as milk is seldom seen in any of the Spanish-speaking homes of the section. Two goats were purchased for seriously undernourished children, and careful instruction was given as to the proper modification of milk and care of the babies and of the goats themselves. It is expected this will be an example which will greatly increase the use of goats' milk.

New Dairy Business.

One of the youngest dairymen on the Government projects is said to be Ralph McCoy, 12 years old, of Rupert, Minidoka project, Idaho.

Ralph's business is still in its infancy, having begun but recently, when he took from the express car one small white baby Swiss goat, two months old. The young dairyman explained that his goat is the possessor of many good qualities, some of which, it must be admitted, a cow can not lay claim to. In the first place, it will eat most anything; it is a good playfellow, easily learns many tricks, and, besides, the milk of the Swiss goat is more nutritious than cow's milk, bringing as high as 25 cents a quart. So Ralph is determined to get right into the game and hopes eventually to raise a herd that will bring him riches and fame.

However, there is more real philosophy in Ralph's reasoning than the local editor gives him credit for. Health experts have demonstrated that the milk of goats is a very valuable food, especially for infants and invalids; that goats are easy to raise; that it costs but little to feed them; that they are cleanly in their habits, and possesses many other virtues. Many goats are raised in the Southwest, and we would like to see Ralph make a real valuable demonstration as to the desirability of goat raising in the Northwest.

A Valuable Bulletin.

The ordinary process of jelly making is fairly familiar to most housewives. The fruit is prepared and cooked to extract the juice, the juice is strained, and "boiled down" if necessary, then the sugar is added, and the mixture is boiled until the jelling point is reached, i. e., until the hot liquid sheets, instead of forming, drop from the edge of the spoon.

However, several fruit juices of pleasing flavor do not make good jelly because they are more or less lacking in one essential ingredient—pectin. Scientific experiment has shown that these juices will jelly if the proper amount of pectin is added to them. The United States Department of Agriculture in a

new publication, Department Circular 254, gives directions for making homemade pectin from apples and citrus peel, and includes many good recipes for jellies with added pectin. This circular may be had upon request. A post card will bring it to you.

As most project farms are "manned" by progressive families, there is more or less fruit raised, certainly many vegetables, and the excess products after the family has had the table supplied or after all marketable crops are sold should be canned or dried for economy and variation in the diet. The Department of Agriculture, this city, will send you clear directions for this work.

To Avoid Ptomaine.

Moist, cooked foods made with milk, eggs, meats, or fish are excellent places for harmful micro-organisms, especially during warm weather, says the Home Economics Division, including many which cause poisoning. Chilled left-overs should be used as soon as possible. Left-over of meat pie, dishes made with cream sauce, soft custard, boiled dressing, and dressing made with cream must be carefully kept and handled and promptly used. They often cause serious poisoning before they taste or smell spoiled. Boiled rice, hominy, and other cereals also spoil quickly.

Fresh vegetables and fruits should be kept clean, well ventilated, and if possible at a temperature between 60 and 40° F. Decayed ones should be frequently sorted out. Very often the decayed portion may be cut away and the rest of the fruit or vegetable used at once. Wilted leaf vegetables sometimes may be freshened by soaking in water just before using, or by being thoroughly wet and placed on ice for a few hours. All vegetables and fruits, especially those to be eaten raw, should be thoroughly washed in running water before they are used. The loss of flavor and texture is very slight and is made up for by the removal of bacteria and possible spray residue. Decaying fruits and vegetables always attract flies and should therefore be buried or securely covered.

Raises Birds as a Business.

It seems that Yakima's "pansy woman" has a rival in originality in Mrs. Anna Blessing. When Mrs. Blessing purchased a pair of imported canaries about 15 years ago she had no idea of going into business. However, she was gradually drawn into raising birds on a commercial basis until now she has dozens of them in her home and has made as much as \$500 a year from the sale of birds.

The first year she sold enough little birds to pay for the original pair, then she just kept on furnishing them to neighbors until her fame spread and the demand for fine singers grew. She has paid as high as

\$50 apiece for her imported birds and has sold them for \$15 to \$35 each. The "Rollers" are considered the best singers and are in great demand. One of her imported birds brought \$200 in one year through the sale of young canaries.

It takes two weeks for the eggs to hatch, and the mother canary sits on the nest constantly, leaving the eggs only occasionally to get a drink or food. From three to six eggs constitute a sitting, although the smaller number produces stronger birds. When the birds are three weeks old they leave the nest and some of them begin to sing in a few weeks.

Common canaries will imitate the song of a good bird, but upon being removed from the presence of the finer breed will frequently lapse to their old plain song.

Mrs. Blessing is not full of a lot of theories about raising birds, nor is she sentimental over them. She has made a success of raising them and enjoyed doing it.

This is a good pin-money business for any woman or girl, and there are only a few rules to follow to insure success. Scrupulous cleanliness is the first of these, the perches, cups for food and water, and the bottom of the cage being cleaned every day. A stack of papers cut to fit the bottom will facilitate matters, a clean paper being placed in the cage every morning and the old one removed with the litter. Fresh drinking water, plenty of seed and lettuce, a little gravel in the bottom and a piece of cuttle bone will suffice, although the birds greatly relish an occasional piece of moistened cracker, or the yolk of a hard-boiled egg, a bit of fruit, water cress, or pepper grass. They should be given an opportunity to bathe every morning, especially in hot weather. It is better for the bird and easier to keep cages clean not to put the bathing dish in the cage. Simply fill with water, place the dish on a newspaper, and while the perches and bottom of the cage are being washed the bird can bathe. Carefully protect from drafts or excessive heat or cold.

A woman of this city makes a nice little sum every summer boarding birds and gold fish while their owners are away from home on their annual vacations. She likes the work and finds it quite lucrative.—L. L.

The directors of the Huntley project irrigation district have authorized an expenditure of \$2,000 for drainage work, to be charged to operation and maintenance.

The percentage of hens classed as culls—that is, not capable of producing enough eggs to pay for their feed—has been reduced in Idaho flocks from 55 per cent in 1919 to not exceeding 24 per cent in 1922.

HOW ONE FARMER MAKES THINGS GO ON THE FLATHEAD PROJECT, MONTANA.

By Rev. Ralph Carleton, Ronan, Mont.

No, he didn't commence with 1,000 acres of land, a big tractor, and a string of gang plows that would turn over 40 acres of sod a day. His little 80-acre farm, with one team, two heifers, a plow, and a hoe looked mighty modest in comparison with some of the big fellows who expected to break up 3 sections, raise 50 bushels of wheat to the acre, and retire to California in 5 years worth half a million. The 80 itself did not look a few years ago like anything worth writing home about. Twelve miles from this town, in the western part of our valley, with desolate hills upon the west, inhabited by coyotes, the prospect was not the brightest.

But this farmer married a wife and faced the future filled with the expectations of hope. Only seven years ago, in 1917, he planted 2 acres of alfalfa, and purchased two scrub heifers, the best he could get. Each succeeding year he enlarged his alfalfa acreage and kept grading up his cows by a thoroughbred Holstein sire. He was growing into his job.

Last year his eight Holstein cows brought him, in round numbers, \$1,000 worth of dairy products. He still had the by-products in the shape of humus which went back into the land and the milk which went into the production of calves and pork. This last year his hogs, which had cost him practically nothing that he had not raised upon the farm, brought in another \$1,000. Then, besides the hay consumed upon the farm, he sold \$200 worth of alfalfa and delivered to our local butcher \$200 worth of beef cattle. He kept 80 chickens, which gave him an income of \$300 a year, and sold in the local market \$100 worth of fruit and garden truck; all of which added up, amounts to the very neat income of \$2,800 a year, besides the food raised upon the farm and consumed by the family, which at a conservative estimate would have amounted to \$200 more.

Last May this farmer bought a Ford car, costing \$560, for which he paid cash. In the last few weeks he has purchased a \$200 manure spreader, the latest model washing machine, costing \$150, a gasoline engine and roller mill outfit costing \$80, paying cash for each of these articles. A store bill is an unknown quantity at his home. His house and barn and outbuildings are not large, but they are comfortable and convenient, and there are no mortgages hanging over them.

This progressive farmer tells me that with his ever-increasing acreage of alfalfa, in a few years he will have 25 dairy cows, better graded than they are now, which at present prices will bring in \$3,000 a year. He expects to multiply his flock of chickens by two and a half, and to expand in other ways.

No, there isn't the least likelihood that Lars Beck will die a millionaire, but he is extracting a very comfortable living for himself and his very fine family. Incidentally, it might be remarked, Lars Beck doesn't seem to be working overtime cussing the millionaires and hurling sulphuric brimstone at the Government, and I honestly think that people of this type are extracting more of the right wealth of life than any man who ever dealt in the "frenzied finance" of Wall Street.—*Ronan (Mont.) Pioneer.*

Optimism on the Uncompahgre Project, Colorado.

Ernest L. Miller, editor and manager of the Montrose (Colo.) Enterprise, writes as follows in a recent editorial:

"We have much to be thankful for in the Uncompahgre Valley. If you don't think so, take a drive among the farms. The last rains assisted the irrigator materially. Sugar beets will probably be the most profitable crop and those farmers who put them in right are smiling a broad smile. The stand is unusually good, and the plants have made satisfactory growth. By the time of this issue, thinning will be well under way. The labor appears to be of a better class than usual and are taking hold in earnest. Potatoes are beginning to come through and should get a good start. Very little rot has thus far been experienced, due no doubt to seed selection, that many fumigated.

"Wheat was generally dipped, is looking fine, and should be free from smut. A considerable new acreage of oats has been planted and there is no complaint about the stand. Mexican beans will show a decided increase and are doing well. With but few exceptions the orchards have set well and while late in blossoming, the general condition of the soil is such that the fruit will make a normal growth. Onions never looked better and should make a wonderful yield. Winter wheat is a small acreage, but the stand is very even and is making a vigorous growth. Alfalfa is making a rapid growth and will give a big yield.

"Dairy cows have freshened up considerably because of the good condition of the pastures. A pleasing sight is the number of sows with little pigs. Conditions are promising. The variety of crops together with the large increase in poultry and live stock on the farms speaks as a certainty for prosperous conditions this fall. It means less fun and more work with a certainty of fair returns for the work. This spirit will give confidence to the individual and that inspires confidence in the community, which in turn means liquidation of obligations this fall, renewed hope, and a proper planning for 1924 crops while growing and harvesting the 1923 crop."

In this editorial Editor Milner breathes the spirit of optimism and of determination to make good, which

is becoming more and more characteristic of all our projects. Under the inspiring leadership of Secretary Work, David W. Davis, Commissioner of the Bureau of Reclamation, and Field Reclamation Commissioner Cannon, there can be no question of the closest cooperation between the Bureau of Reclamation and the settlers on the projects, which should have a material effect in helping to solve such problems as the character of crops best suited to the varying project conditions and how to market these crops to the best advantage.

Let us have more editorials like this from Editor Milner.

Seeing Arrowrock Dam on the Boise Project, Idaho.

Thousands of Sightseers Go Through Huge Structure Annually.

Since its completion in 1915 Arrowrock Dam has been visited by an ever-increasing number of sightseers, the majority of whom desire upon their arrival at the dam to be shown through its interior inspection galleries. Early in 1921 Ada County, Idaho, completed a highway from Barberton to Arrowrock Dam, at an expense of about \$225,000. This improvement provided a good safe highway for those desiring to visit Arrowrock. From then on the number of summer visitors, including many tourists from distant points, constantly increased. On Sundays the crowds frequently numbered as high as 300 people. We were, as a general rule, unable to grant the many requests for admission to the interior of the dam, for the reason that it is not safe to allow visitors to go unescorted up and down the long flights of steps, portions of which are sometimes wet and slippery, and for the further reason that it would not be proper for the project to allow its operating employees at the dam to expend their time in that manner. The Boise Chamber of Commerce suggested and recommended that some provision be made for permitting all visitors who so desired to go through the dam. So the following approved plan was put into effect early in 1922: Notices are posted at the dam to the effect that at certain hours of the day the services of a guide will be available to all visitors desiring to be shown through the interior of the dam and that the charge for such service is 25 cents per person, which entitles each visitor to a descriptive postal card of Arrowrock Dam. The notices also state that each person desiring admittance must, before entering the dam, secure from the guide a postal card, which constitutes his admission ticket.

Photographic postal cards to the number of 7,000 were turned out by the photographic section of the Washington office and sent to the Boise project office for this purpose. These cards are numbered consec-

utively and issued in lots of 500 to the reservoir superintendent at Arrowrock, who is held responsible for a proper accounting for all cards issued to him. The proceeds are turned over periodically to the Boise office fiscal agent and his official receipts issued therefor.

During week days one employee is usually able to take care of all visitors by putting in only part time in escorting people through the dam, but on Sundays and on other special holidays or occasions the services of two or sometimes three employees are necessary during such rush periods.

For the first season the guide service account netted a profit of \$706.69, as shown by the following tabulation:

Gross receipts from paid admissions.....	\$1, 383. 75
Total expense, including services of guides and total cost of 7,000 postal cards, not all of which were used during 1922.....	677. 06
Net profit.....	706. 69

Flame Thrower to Fight Grasshoppers.

Reminiscent of the World War is a device for fighting grasshoppers recently perfected on the Klamath project, Oregon-California. The device is described as follows by Project Manager Newell:

The arrangement consists of a small truck or wagon on which is mounted a small air compressor, gasoline driven; an air tank, which in this case is an ordinary hot-water tank such as would be used with a kitchen stove; and a barrel of gasoline. By means of piping, the air and gasoline are delivered to two flattened nozzles through about 40 feet of five-eighths or three-fourths inch rubber garden hose. By this contrivance a spray of gasoline and air is forced from the end of the flattened nozzles. This is lighted and the result is a sheet of fire with which the operator can mop the ground or spray it exactly as a garden would be sprayed. The air compressor is of sufficient power for a third line of hose and with this equipment a zone 80 feet wide can be covered.

Mr. Newell states that the grasshoppers usually move in ranks with a front anywhere from 100 yards to one-fourth mile and with a depth of perhaps 50 to 100 feet. When they are well bunched a flame thrower such as described will be found effective.

The device was worked up largely by C. B. Dunnington, a Tule Lake homesteader of mechanical experience. The idea of using a hose with the nozzles is the result of a suggestion from Jack Whitney, superintendent of construction. The device calls for little expensive equipment, is flexible, and will be found very useful as a supplement to poison.

RECLAMATION LAW NOTES.

By Ottamar Hamel, Chief Counsel.

Payment of Water Charges in Idaho under State Law.

Under section 5636, Idaho Compiled Statutes, 1919, an irrigation company may require claimants of water from its irrigation system to pay or give reasonable security for the payment, in advance, for maintenance assessments, before it can be required to furnish the same to users. Section 5631, Idaho Compiled Statutes, 1919, gives a remedy for unpaid assessments to an irrigation company by first lien upon the premises and the right to enforce the same by foreclosure. This remedy, coupled with the right to require payment or reasonable security for the payment of assessments in advance, furnishes ample and sufficient protection, and works no injustice to the user or the company. Under the provisions of section 4, Article 15, Idaho Constitution, and of section 5556, Idaho Compiled Statutes, 1919, an irrigation company is without authority to withhold delivery of water from a stockholder rightfully entitled thereto, on account of nonpayment of assessment due for past years, upon a tender of payment by him of the amount of assessment for the current year, and delivery of water, upon proper demand therefor and tender of payment of assessment for the current year, may be compelled in a mandamus proceeding. A provision in a contract between an irrigation company and a settler providing "It is agreed that no water shall be delivered to the purchaser from said irrigation system while any installment of principal or interest is due and unpaid from the purchaser to the company or while any toll or assessment is due and unpaid from the purchaser to the company," is contrary to public policy, and therefore unenforceable and void. (*Reynolds v. North Side Canal Co.*, 213 Pac. 344; citing *Adams v. Twin Falls-Oakley Land and Water Co.*, 29 Idaho 357, 161 Pac. 322; *Shelby v. Farmers' Cooperative Ditch Co.*, 10 Idaho 723, 80 Pac. 222; *Crow v. San Joaquin & K. R. Canal and Irrigation Co.*, 130 Calif. 309, 62 Pac. 562, 1058; and *Parrott v. Twin Falls Salmon River Land & Water Co.*, 32 Idaho 759, 188 Pac. 451.)

Irrigation Rights on Interstate Streams.

Water of a stream flowing from Colorado into Nebraska was diverted in Colorado by a Nebraska corporation and transported through its canal to Nebraska, where it was sold and used on Nebraska lands. Held, that the appropriation was superior in right to later appropriations from the stream made in Colorado for use on Colorado lands, and that State offi-

cials of Colorado were properly enjoined from interfering with it and from treating the appropriator, in the distribution of water, otherwise than if the canal and lands irrigated therefrom were wholly within that State, notwithstanding their objection that the waters of natural streams in Colorado are, by her constitution and laws, the property of the public, dedicated to the use of her people, and can not be taken for use elsewhere as against persons desiring to use them in Colorado. (*Welland, State Engineer, Etc., v. Pioneer Irrigation Co.*, 259 U. S. 498.)

Abandonment of Water in Montana.

Under the direct provisions of Montana Revised Codes, 1921, section 7094, abandonment of an appropriation of water is a question of fact to be determined as other questions of fact. Where an appropriation of water for irrigation purposes was made, but no use of such right was made from 1889 to 1892, from 1893 to 1900, and from 1905 to 1909, and it appeared that the original appropriator left the State in 1889 and did not return, and that the right was sold for a valuable consideration in 1909, it will not be inferred that the appropriation was abandoned. To constitute abandonment, there must be a concurrence of act and intent, the relinquishment of possession, and the intent not to resume it for a beneficial use. One claiming abandonment has the burden of proving his contention by a preponderance of evidence, and to establish the abandonment the evidence thereof must be clear and definite. (*Thomas v. Ball*, 213 Pac. 597.)

California Water Storage District Act Constitutional.

In the case of *Tarpey v. McClure* (213 Pac. 983) the Supreme Court of California, on March 13, 1923, held constitutional the California water storage district act (Statutes 1921, p. 1727). This act provides for the organization, operation, maintenance, and government of water storage districts; for the acquisition by various means, and the storage, conservation, and distribution of water for irrigation and for drainage and reclamation connected therewith; and for the generation and disposition of hydroelectric energy developed incidental thereto. It also provides for the repeal of the California irrigation act of 1915 and all acts amendatory thereof.

Irrigation Easements in Nebraska.

Where an irrigation canal company, with the consent of a drainage district and the owner of a tract of adjacent land affected by flowage, constructed works

whereby it was enabled to use water discharged from the drainage ditch into its canal for irrigation purposes, which use had continued for several years, a subsequent purchaser of the land affected may not restrain this use of the water upon the ground that the canal company had not acquired the right to appropriate the water. One who purchases land burdened with an open and visible easement is charged with notice of the same, and the estate he purchases is servient to the easement. (*De Conly v. Winter Creek Canal Co.*, 193 N. W. 157.)

Sale of Interest in Unsurveyed Public Land.

William McConnell was in possession and occupancy under claim of right to desert entry, of certain open, unsurveyed public land in Montana, upon which he had placed certain improvements. He had posted notice of his claim on the land and in the office of the county recorder. In 1914 he transferred his claim to Dan Blackley, accepting the latter's note therefor. Blackley thereafter made homestead entry for the land and received patent from the Government. Blackley refused to pay the note on the ground that it was without consideration. His defense was held not good by the Supreme Court of Montana, in *McConnell v. Blackley* (214 Pac. 64).

Irrigation District Warrants in California.

Warrants issued by the board of directors of an irrigation district, and void because based on a single demand, only part of which they were authorized by California Gen. Laws, Act 1726, sec. 61, to allow, are subject to the defense of invalidity in the hands of a purchaser from the original holder; they, though negotiable in form, being issued by a statutory board as a convenient method of ordering payment from the district's treasury, and not being negotiable in the sense of the law merchant. (*Ser-Vis v. Victor Irr. Dist.*, et al., 214 Pac. 223.)

Changes in Diversion and Use of Water in Montana.

Neither a change in the place of diversion nor in the use of water from mining to agriculture or vice versa will affect appropriations of water rights, in view of Montana Revised Codes 1921, section 7095, providing that the person entitled to the use of water may change the place of diversion, and may use the water for other purposes than that for which it was originally appropriated, and of the history of legislation. (*Thomas v. Ball*, 213 Pac. 597.)

Changes in Diversion of Water in Colorado.

No change of the point of diversion of irrigation waters in Colorado, for the purpose of making an enlarged use thereof as to time and amount, can be granted. (*Huerfano Ditch and Reservoir Co. v. Welton Land and Water Co.*, 213 Pac. 908.)

Land Title Not Necessary to Appropriate Water in Montana.

An appropriation of water is not impaired by the fact that neither the appropriator nor his successors in title hold legal title to the premises upon which the water is used. (*Thomas v. Ball*, 213 Pac. 597.)

A Natural Refrigerator at Hubbard Damsite, Flathead Project.

Excavation for the foundation of Hubbard Dam, Flathead (Indian) project, Montana, has disclosed rather unusual conditions. To reach bedrock for the left half of the dam it was necessary to remove from 8 to 85 feet of overburden. This was in the form of a talus slope at the foot of an almost vertical cliff about 175 feet high, and the material graded from rocks of several cubic yards each through coarse rock, fine rock, gravel, and sand to a fine rock meal and clay. This mixture was solidly frozen and all interstices were filled with solid ice, so that the whole lower portion of the material to be excavated was in the solid mass or sheet from 6 to 12 feet in thickness.

All efforts to dig this material with the 1½-yard steam shovel were futile, so shooting was resorted to. As attempts to drill into the mass were unsuccessful, bulldozing was tried with fair success, T. N. T. placed in shallow holes being used. By this means, successive thin layers of the material were broken up so that it could be removed by a scraper bucket. Unfrozen ground was finally reached, but not until 6 to 12 feet of the ice-bound mass had been shot away over an area of about 50 by 140 feet. As many as 80 holes per shift were shot.

The encountering of ice and frost was no surprise, as test drifts and pits had indicated their presence, but it was not thought that the thickness would be so great nor that the frost and ice would extend below the water level of the creek as it did. Also it was expected that the mass would thaw out when exposed, but despite the fact that a considerable area was uncovered and exposed to the sun as early as September 1, and that water from the shovel and supply lines ran over it, very little thawing took place, the clay, sand, and rock meal apparently constituting almost perfect insulation.

That ice keeps forming seems to be indicated by the fact that huge icicles have formed in the test drifts, and test holes sunk below the floor of the drift have filled with solid ice. In one drift, which had been fitted with a rough door so as to serve for a refrigerator for the camp mess, ice thawed but little even during July and August.

ADMINISTRATIVE AND STATISTICAL PROGRESS REPORTS FOR MAY, 1923.

Monthly Conditions of Principal Bureau of Reclamation Reservoirs for May, 1923.

(Elevation above sea level.)

State and project.	Reservoir.	Available capacity in acre-feet.	Elevation.		Storage in acre-feet.			Out-flow in acre-feet.	Elevation of water surface.		
			Spill-way crest. ¹	Lowest gate sill. ²	Beginning of month.	End of month.	Maximum.		Beginning of month.	End of month.	Maximum.
Arizona, Salt River.....	Roosevelt ³	1,575,000	2128.1	1924.6	696,119	618,626	696,119	77,493	2103.23	2096.49	2103.23
California, Orland.....	East Park.....	51,000	1199.68	1111.68	51,060	47,550	51,060	2,940	1199.71	1197.76	1199.71
Idaho:											
Boise.....	Arrowrock.....	280,000	3211	2956	144,600	281,300	284,000	278,808	3156.8	3212.6	3213.5
	Deer Flat.....	177,000	2518	2488	154,671	144,646	154,671	50,854	2515.8	2514.5	2515.8
Minidoka.....	Lake Woleott.....	95,180	4245	4236	93,550	106,030	109,320	810,208	4244.86	4245.9	4246.16
	Jackson Lake.....	847,000	6769	6728	424,510	618,380	618,380		6751.41	6759.75	6759.75
Montana:											
Milk River.....	Nelson.....	70,000	2223	2200	30,800	23,000	31,000	2,320	2213.78	2212.81	2213.85
St. Marys storage.....	Sherburne.....	66,000	4788	4720					4125.6	4126.4	4126.4
Sun River.....	Willow Creek.....	16,700	4130	4085	12,485	13,260	13,260		5814.8	5839.2	5839.2
Nebraska-Wyoming, North Platte.....	Pathfinder.....	1,070,000	5852	5670	464,980	812,050	812,050	9,408	4178	4180.4	4180.4
	Lake Alice.....	11,400	4182	4159	8,493	10,200	10,200		4115.4	4126.1	4126.8
	Lake Minatare.....	60,760	4125	4074	41,365	63,160	63,160		6226.22	6226.87	6226.87
Nevada, Newlands.....	Lake Tahoe.....	120,000	6230	6224					4155.8	4158.8	4158.8
	Lahontan.....	273,600	4162	4060	217,700	243,300	243,300	56,390			
New Mexico:											
Carlsbad.....	McMillan.....	45,000	3267.7	3241.6	14,000	7,500	14,000	6,000	3260.8	3258.6	3260.8
Rio Grande.....	Elephant Butte.....	2,638,000	4407	4231.5	1,365,220	1,466,947	1,466,947	119,010	4368.3	4372.1	4372.1
Oregon, Umatilla.....	Cold Springs.....	50,000	621.5	560	48,200	48,600	49,450	12,083	620.31	620.56	621.14
Oregon-California, Klamath.....	Clear Lake.....	462,000	4540	4514	383,000	372,000	383,000	2,000	4537.1	4536.6	4537.1
South Dakota, Belle Fourche.....	Belle Fourche.....	203,000	2975	2920	156,220	177,670	177,670	6,235	2968.6	2971.6	2971.6
Utah, Strawberry Valley.....	Strawberry.....	250,000	7558	7517	222,600	258,600	258,600	118,000	7554.2	7559	7559
Washington:											
Okanogan.....	Conconully.....	14,400	2290	2232	4,480	5,937	5,937	3,096	2264.4	2268.9	2268.9
Yakima.....	Bumping Lake.....	34,000	3426	3389	17,160	37,575	38,125	550	3411.6	3423.9	3423.9
	Lake Cle Elum.....	20,800	2134	2122	28,975	28,125	32,725	4,600	2136.1	2135.7	2137.7
	Lake Kachess.....	210,000	2258	2192	132,375	180,470	180,470		2236.5	2248.6	2248.6
	Lake Keechelus.....	152,000	2515	2425	111,980	152,440	152,765	325	2497.6	2514.9	2515
Wyoming, Shoshone.....	Shoshone.....	456,600	5360	5132.3	336,686	398,542	398,542	124,500	5340.1	5350.9	5350.9

¹ Or maximum storage.² Or zero storage.³ Zero water depth at elevation 1902.2.⁴ Amount of silt shown by silt survey deducted from original capacity.⁵ Proposed regulation.⁶ Estimated low-water limit under proposed plan of regulation.⁷ Elevation of reservoir raised 12 inches by stop logs in spillway.

SALT RIVER PROJECT, ARIZONA.

May was started and completed with four crews in the field, and the following maintenance work was accomplished: 20½ miles of main canal cleaned, 5½ miles of main canal brushed, 15 miles of main canal mowed, 44 miles of main canal demossed, 64½ miles of lateral cleaned, 141 old structures repaired, 1,337 linear feet of rip-rap placed, 12½ cubic yards of concrete placed, 400 cubic yards of earth excavated, 592 cubic yards of earth embankment placed, 42½ cubic yards of backfill placed.

With a daily average of 51 man-days and 3 stock-days, the following construction work was accomplished for maintenance camps: 2½ miles of new waste ditch dug, 1½ miles of new irrigation ditch dug, 52 new structures installed, 471 linear feet of 24-inch concrete pipe installed, 47 linear feet of 30-inch corrugated iron pipe installed, 10 linear feet of 24-inch corrugated iron pipe installed, 18 linear feet of 18-inch corrugated iron pipe installed, 137½ cubic yards of concrete placed, 6,346½ cubic yards of earth excavated, 238 cubic yards of earth backfill, 84 cubic yards of earth placed, 5 concrete culverts installed, 7 concrete checks installed, 1 sand trap installed, 600 linear feet of gopher wall installed.

The P. & H. one-half yard dragline machine was overhauled and moved to the Indian Bend wasteway job.

The concrete pipe plant made the following pipe: 1,944 linear feet of 24-inch concrete pipe and 96 linear feet of 30-inch concrete pipe.

Operation of power system.—Total power generated during month, 9,502,510 kilowatt hours; maximum daily output (May 3), 328,090 kilowatt hours; maximum load (May 11), 14,440 kilowatts; maximum daily average load, 13,670 kilowatts; average load for month, 12,770 kilowatts; highest daily load factor, 97.3 per cent; lowest daily load factor, 90.8 per cent; monthly load factor, 88.5 per cent. The output of the power system for the month was 1.6 per cent greater than the output for May of any preceding year.

The Roosevelt power plant operated continuously during the month. The maximum output at Roosevelt dropped from 10,400 kilowatts at the first of the month to 9,850 kilowatts at the end of the month, owing to the lowering of the lake level from 178.5 to 171.89 feet during the month. The Cross Cut plant operated continuously. The South Consolidated plant operated 99 per cent of the time, being shut down for one day while insulators were being changed on the South Consolidated 45,000-volt transmission line. The Arizona Falls plant operated continuously. The Chandler plant operated 99.5 per cent of the time.

—C. C. Cragin.

YUMA PROJECT, ARIZONA-CALIFORNIA.

The price of alfalfa hay remained firm at about \$15 during May and on this account the amount turned to seed was expected to be below normal. Prospects or seed yield were about normal. Cotton was a little late, but in good condition.

The Ruth dredges cleaned 22.6 miles of laterals during the month. Construction work on the North drain was continued, one-half mile of drain being completed with an excavation of 16,700 cubic yards. On the Southwest drain 0.8 mile was completed with an excavation of 18,600 cubic yards. Three timber bridges and three metal flumes were built across these drains. The 36-inch motor-driven pump at the Valley drainage pumping plant was tested at the end of the month.

Mesa division.—The pipe manufacturing plant was practically closed down on the 29th, a small force being retained to clean up and store equipment. During the month 6,952 linear feet of pipe was manufactured in 18-inch, 39-inch, and 45-inch sizes. Six thousand and sixty-four feet of pipe were hauled to the field. Laterals B-20 and B-20-6, consisting of one mile of 18-inch pipe and one-half mile of 24-inch pipe, were completed except for sealing joints and back-filling. Five structures, requiring 11 cubic yards of concrete, were completed.

The season's planting was practically completed. Trees and cover crops were showing good growth.—*Porter J. Preston.*

ORLAND PROJECT, CALIFORNIA.

May weather was moderate with prevailing winds from the north which were cool and lacking in their usual desiccating nature. Light showers and cloudy days were frequent occurrences.

Owing to the diminished flow of Stony Creek because of the light snow fall on the headwaters of the stream it was necessary to begin draft on storage at East Park on May 14, which is about 30 days earlier than usual. There was a heavy demand for irrigation water throughout the month, approximately 10,000 acre-feet being delivered.

Cutting of the second crop of alfalfa was in progress at the close of the month, a good yield resulting. Planting of milo was started and preparations were being made for beginning the grain harvest during June. The Orland alfalfa meal mill was in operation throughout the entire month, 550 tons of hay being delivered to the mill. Sheep shipments from Orland were exceptionally heavy, totaling 51 cars.—*R. C. E. Weber.*

GRAND VALLEY PROJECT, COLORADO.

The weather during May was favorable for outside work. No damage from frosts was experienced.

Crops were in excellent condition and prospects were never more favorable. The largest acreage of sugar beets in the history of the project had been planted, amounting to over 2,000 acres. An excellent stand had been secured in most cases. Alfalfa made a good growth during the month and the first cutting will be ready for harvest early in June. The prospect for a heavy fruit crop, particularly of peaches and pears, throughout the valley was excellent.

The irrigation system was operated throughout the month with little interruption, supplying 13,000 acres of projected lands, 8,000 acres in the Palisade and Mesa County irrigation districts, and 3,000 acres in the Orchard Mesa irrigation district. Considerable difficulty was experienced on account of severe wind

storms on the last two days of the month, which filled the canal and laterals with tumble weeds, but the removal of the weeds was accomplished with little interruption of water service. A maximum diversion of 800 second-feet was being made at the end of the month which, on account of supplying the Orchard Mesa irrigation district for the first time this season, was the largest in the history of the project.

The pouring of concrete in the siphon under the Colorado River for the Orchard Mesa irrigation district was completed on May 5 and water was turned through this siphon on the 10th, the district thereafter securing its entire water supply through the project system. The construction of the siphon was completed except for the installation of the gate-operating machinery, which had not been delivered. In addition to the siphon, 850 linear feet of concrete flume of 800 second-feet capacity was completed and put in service. Drainage construction was resumed with one Monighan dragline, working two shifts per day. A second dragline was being overhauled and will be put into operation in the near future.

Special Assistant Secretary David W. Davis, Director A. P. Davis, and Commissioner Miles Cannon visited the project on the 21st. In the forenoon, in company with the directors of the Grand Valley Water Users' Association and the Orchard Mesa irrigation district, a trip was made to the diversion dam and the siphon recently completed under the Colorado River for the Orchard Mesa district. The return trip was made over Orchard Mesa and the visitors were guests of the water users' association at lunch in Grand Junction. In the afternoon some time was spent in listening to statements of individual water users, followed by a trip over the lower end of the project. In the evening a banquet was served in Grand Junction by the directors of the association and the irrigation district.—*S. O. Harper.*

UNCOMPAGHREE PROJECT, COLORADO.

The uncollected water rental accounts due on account of irrigation water furnished during the season of 1921 now amount to \$1,207.28. The total cash collections on May 31 on account of irrigation water furnished during the season of 1922 amounted to \$102,502.62.

The P. & H. dragline was engaged during the entire month on the cleaning and enlargement of the West canal. The Ruth dredger completed the cleaning of the Loutsenhizer canal between Cedar Creek and the North Mesa lateral headgate on May 23. The machine was then moved to Spring Creek Mesa and work was begun on the cleaning of the C. J. A. lateral. The semicircular metal flumes on the C. J. A. lateral at the upper end of the system were reinforced by the installation of intermediate rods. Work was begun on the driving of about 30 feet of protective round piling on the right bank of the Uncompaghere River below the Loutsenhizer canal sluiceway works.

A short section of concrete floor and a portion of the right side wall on the South canal lining between drops 3 and 4 of seven drop section failed on May 10. The failure was located in a section of the old concrete lining that was not reinforced. The head in the canal was shut out gradually that afternoon and work was begun the next day on the necessary rock backfill and concrete repairs. The concrete floor in this section was extended for a distance of 48 feet, which work necessitated the placing of 55 cubic yards of concrete. The irrigation head was turned back in after a three-day shutdown.

A head of 875 second-feet was maintained in the Gunnison tunnel until May 5, after which time the head was gradually reduced until on May 28 only 400 second-feet were being diverted. From this time until the end of the month it was necessary to raise the diversion gradually from the Gunnison River to 725 second-feet, owing to the fact that the low snow run-off on the Uncompahgre watershed had been exhausted and the melting of the high snow had not yet begun.—*L. J. Foster.*

BOISE PROJECT, IDAHO.

Light frosts on May 27 and 28 damaged the early potatoes to a slight extent in some sections; other crops were uninjured. The planting of corn and late potatoes was completed. The cutting of the first crop of alfalfa started early in June. All crops were irrigated and were in excellent shape.

The entire canal system was in operation. The main canal carried from 2,300 to 2,400 second-feet for irrigation use and for supplying Deer Flat Reservoir. The filling of Arrowrock Reservoir was completed on May 26.

Minor repairs were made to several of the canal structures. A few timber structures which had decayed were replaced.

The run-off from the Boise River watershed was about 13 per cent below the mean for the past 28 years. The supply was ample for all irrigation and storage requirements, and a small quantity was wasted.

Drainage work was continued with the P. & H. drag line on the Wilder area. The erection of a transmission line and the moving of an electric-operated drag line were under way. It was expected to start excavation with electrical equipment in the vicinity of Wilder at an early date. Austin No. 4 drag line was used on the excavation of short drains in Fargo Basin.

Special Assistant Secretary of the Interior David W. Davis and Field Commissioner Miles Cannon were on the project from May 7 to 13. Director A. P. Davis spent May 11 to 13 in inspecting the project.—*J. B. Bond.*

KING HILL PROJECT, IDAHO.

May weather was somewhat cooler than usual and favorable for construction and operation.

The force of 130 men on the 1st was reduced to 111 men on the 30th. Five small camps were operated on construction work. The labor turnover was heavy and all work was shorthanded.

Government forces completed the concrete block around the 54-inch lock-joint pipe at Basin siphon and placed 2,010 yards of back fill at this structure; 250 linear feet of 12-inch concrete discharge pipe was placed and the penstock at pump No. 1 completed and the pump put in operation. The Hafer branch of the King Hill siphon was back filled. On the King Hill lateral 3,500 linear feet of 12, 18, and 20 inch wood-stave pipe were placed and 400 feet of No. 42 metal flume erected; 75 per cent of the back fill on the structure was completed. On lateral 11½ a concrete turnout from the main canal and 2,050 linear feet of concrete chute and 200 feet of 24-inch lock-joint pipe were placed. The structure is now 60 per cent complete. On lateral 3½ E, 1,000 square yards of rock paving were placed in 1,100 linear feet of chute. One hundred linear feet of lock-joint pipe were placed in the siphon across the railroad right of way. Inlet,

outlet, and relief valve structures were completed. Grouting of the rock paving remains to be completed. Concrete chutes and turnouts for laterals 12 E, 13 E, and 13½ E were completed. The three structures contain 56 yards of concrete and total 775 feet in length. Three and one-half miles of new laterals were built. Minor structure crew installed 83 weirs, 6 main canal turnouts, 26 farm turnouts, 8 lateral checks, and 4 lateral bridges.

An uninterrupted flow of water in the canals was maintained and an average of 170 second-feet of water delivered to the farms. A crew of seven men was engaged in installing farm turnouts and weirs and repairing wooden structures.—*A. M. Rawen.*

MINIDOKA PROJECT, IDAHO.

Good growing weather prevailed during most of May although the temperature fell below freezing on one or two occasions.

The irrigation system was operated throughout the entire month, the demand for water being heavy. This demand was materially reduced by rains near the end of the month.

On May 12 was held an election to vote on the question of a bond issue by the American Falls Reservoir district to aid in financing participation in the reservoir. The vote was 5,107 to 527 in favor of the bonds or nearly 10 to 1. The vote on the approval of the proposed contract between the district and the Government was carried by a vote of 5,031 to 465.

Special Assistant Secretary David W. Davis, Director A. P. Davis, and Commissioner Miles Cannon spent from the 14th to the 17th inclusive on the project and at American Falls. Public meetings were held at Rupert and Burley and a number of conferences were held at American Falls in connection with the work at that place.—*Barry Dibble.*

HUNTLEY PROJECT, MONTANA.

May weather was favorable for all work in progress and especially so for agricultural work.

Maintenance work was nearly all completed, only a few small jobs remaining, all of which can be done after water is turned in.

Water was turned into the Main canal on the 22d and one unit of the hydraulic pumps started on the 23d and continued in operation for the rest of the month. The demand for water, however, was light.

The Ruth machine began work cleaning G 072 on the 24th. The Austin dragline completed its work and was stored at Pompeys Pillar until needed for fall work.—*A. R. McGinness.*

MILK RIVER PROJECT, MONTANA.

May weather was about normal as to temperature, but markedly deficient in precipitation until the last day of the month. The last killing frost occurred at Malta on the 18th. The weather, however, was good for construction and farming operations, but poor for growing crops.

Construction by Government forces included the excavation of waste water ditches below Willow Creek by dragline and one crew a part of the month putting in small structures, such as pipe and wooden turnouts, checks, and measuring devices. Three small earthwork contractors and two structural contractors resumed or commenced operations and made fair progress.

Irrigated crop report Lower Yellowstone project, Montana-North Dakota, 1922.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average (per acre).	Per unit of yield.	Total.	Per acre.
Alfalfa.....	6,375	Tons.....	12,542	2.0	\$7.00	\$87,795	\$14.00
Alfalfa seed.....	72	Bushel.....	279	4.0	12.00	3,354	48.00
Alfalfa, new.....	88	Tons.....	18	.2	7.00	126	1.40
Barley.....	116	Bushel.....	2,461	21.2	.40	1,084	9.35
Beans.....	84	do.....	981	11.7	2.50	2,452	29.20
Beets, sugar.....	1,107	Tons.....	11,950	10.8	6.00	71,706	64.80
Beets, tops for feed.....	1,107	do.....			3.50	3,874	3.50
Cane.....	75	Tons.....	325	4.2	5.00	1,625	21.00
Corn.....	972	Bushel.....	27,980	28.9	.40	11,192	11.56
Corn, ensilage.....	55	Tons.....	331	6.0	4.50	1,489	27.00
Corn, fodder.....	122	do.....	331	2.7	7.00	2,317	18.90
Clover hay, sweet.....	160	do.....	309	1.9	5.00	1,545	9.50
Clover seed, sweet.....	5	Bushel.....	10	2.0	4.80	48	9.60
Flax.....	44	do.....	236	5.4	2.10	495	11.34
Garden.....	167	do.....				12,742	76.00
Hay.....	308	Ton.....	5,165	1.7	5.00	25,825	8.50
Oats.....	1,296	Bushel.....	45,794	35.3	.25	11,448	8.82
Pasture.....	374	do.....				3,769	10.06
Potatoes.....	629	Bushel.....	90,989	144.6	.25	22,747	36.15
Wheat.....	3,317	do.....	61,282	18.5	1.00	61,282	18.50
Miscellaneous ¹	34	do.....				7,185	206.76
Less duplicated areas.....	1,107						
Total cropped.....	15,400		Total and average.....			334,100	21.68
Unharvested crop and stubble.....	200						
Total irrigated.....	15,600		Areas.		Acres.	Farms.	Per cent of project.
			Total irrigable area farms reported.....		37,860	575	100.0
			Total irrigated area farms reported.....		15,600	370	41.2
			Area dry farmed.....		13,471		35.6
			Area not farmed.....		6,943		18.3
			Buildings, roads, and laterals.....		1,847		4.9
			Total cropped area farms reported.....		15,400		

¹ Fruit, onions, cabbage, peas.*Nonirrigated crop report (irrigable land), Lower Yellowstone project, Montana-North Dakota, 1922.*

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average (per acre).	Per unit of yield.	Total.	Per acre.
Alfalfa.....	1,640	Ton.....	2,279	1.4	\$7.00	\$15,965	\$9.80
Alfalfa seed.....	10	Bushel.....	5	.1	12.00	60	24.00
Barley and speltz.....	765	do.....	24,154	31.6	.40	9,661	12.68
Beans.....	133	do.....	879	6.7	2.50	2,197	17.25
Beets, sugar.....	8	Ton.....	64	.8	6.00	384	48.00
Cane.....	20	do.....	37	1.8	5.00	1,850	9.00
Corn.....	1,030	Bushel.....	19,400	18.9	.40	7,760	7.56
Corn ensilage.....	51	Ton.....	277	5.4	4.50	1,246	24.30
Corn fodder.....	328	do.....	965	2.9	7.00	6,755	20.30
Clover hay, sweet.....	173	do.....	158	.9	5.00	790	4.50
Clover seed, sweet.....	53	Bushel.....	120	2.3	4.80	576	11.04
Flax.....	315	do.....	2,797	8.9	2.10	5,873	18.69
Garden.....	36	do.....				2,672	73.71
Hay.....	820	Ton.....	816	1	5.00	4,080	5.00
Millet seed.....	52	Bushel.....	480	9.2	2.40	1,152	22.08
Oats.....	2,110	do.....	60,627	28.9	.25	15,158	7.22
Pasture.....	1,035	do.....				4,764	4.62
Potatoes.....	217	Bushel.....	19,640	90.1	.25	4,910	22.52
Rye.....	11	do.....	110	10	.55	61	5.50
Wheat.....	4,468	do.....	68,937	15.4	1.00	68,937	15.40
Miscellaneous ¹	15	do.....				3,090	221.42
Total cropped.....	13,290		Total and average.....			157,940	11.88
Unharvested crop.....	180						
Total dry farmed.....	13,470		Areas.		Acres.	Per cent of project.	
			Total dry area farms reported.....		13,470	35.6	
			Total cropped area farms reported.....		13,290		

¹ Fruit, onions, cabbage, peas.

The combination of dry weather on the irrigable area and a late spring in the St. Mary storage country produced a shortage of water over the Chinook division and the part of the Malta division west of Nelson reservoir, until St. Mary water became available on the last days of the month. There was an ample supply of water for lands under Nelson reservoir. Maintenance included the cleaning of about 3 miles of laterals on the Glasgow division below Willow Creek by the Ruth dredger and repairs to various structures and canals incident to the operation of a canal system.

Petition for forming the Malta irrigation district to embrace project lands from Dodson dam to Hinsdale was filed with the district court on May 25 and hearing set for July 2, 1923.—*George E. Stratton.*

ST. MARY STORAGE.

May weather was favorable. The first part of the month was dry, but there were several heavy showers during the latter part of the month.

The construction work was confined to the completion of a bridge across the last drop at the lower end of the canal. Owing to snow conditions water was not turned into the canal until the 5th, and little was delivered to Milk River until the 10th.—*R. M. Snell.*

SUN RIVER PROJECT, MONTANA.

Cool weather during May and frequent showers put crops in fine condition and did not delay construction work.

The contractor on structures made rather slow progress, and it will be impossible for him to finish in time to irrigate all the crops in the second unit of Greenfields division. The repair job on the main canal was well advanced and should be finished about June 10.

On the Fort Shaw division water was delivered to alfalfa beginning May 21. No water was delivered to lands in the Greenfields division.

On drainage work 3,955 linear feet of Drain C were excavated, or 18,860 cubic yards; average per shift, 484 cubic yards. Work on the electrification of the second dragline was well advanced, and fair progress was being made on construction of transmission line. Delay in shipment of material was holding back the work.

The few acres of sugar beets planted on the project were showing up well. Crops were looking fine, but the grasshopper was the "silent menace," and it looks as if he might make quite a bit of noise.

Carload shipments totaled 20 cars, divided as follows between the different stations: Fairfield, 5 wheat; Fort Shaw, 2 hay; Simms, 10 wheat, 2 hay, 1 potatoes.—*George O. Sanford.*

LOWER YELLOWSTONE PROJECT, MONTANA-NORTH DAKOTA.

May weather was in general favorable for construction, maintenance, and farming operations. The precipitation was much below normal, but was well distributed, and crops were doing well. A heavy freeze on the 8th did some damage to early planted beets, and a few fields had to be reseeded. About 3,500 acres of beets had been planted.

Maintenance work consisted of removing silt from the main canal with the new Koehring dragline, cleaning laterals with the Ruth ditch cleaner, and minor repairs to banks by team methods. One of the old Monighan draglines was steamed up near the end of the month to remove a small slide from the main canal at Arkle Point. Several small crews were en-

gaged in replacing worn-out wooden structures, burning weeds, etc.

Construction work progressed in a satisfactory manner. The principal job by Government force was the erection of the concrete check below lateral RR. Contractors Beauchaine and Klug completed their contract No. 878. Contractors Hoffstot and Swanson made good progress on their earthwork contracts. Schedule 1 of advertisement No. 55 for four main canal checks, under contract with John S. Penson, was nearly completed at the end of the month. John Klug was making excellent progress on Schedules 3 and 4 of the same advertisement.—*H. A. Parker.*

NORTH PLATTE PROJECT, NEBRASKA-WYOMING.

On the Interstate division the cleaning of laterals and the usual repairs necessary before the beginning of the irrigation season were completed. Water was carried through the main canal to Lake Alice and Lake Minatare throughout the month. On account of the lateness of the season, which retarded farming operations, and the frequency of rains there was an unusually light demand for water. At the end of the month the above-mentioned reservoirs were practically full, and the Pathfinder Reservoir was filled to such an extent as to insure plenty of water for the irrigation season. On account of the large run-off below Pathfinder and the light demand for water it was necessary to release only a nominal amount.

On the Fort Laramie division the demands for water were almost negligible, but the canals and laterals were primed in Wyoming and in the new area under the Horse Creek lateral the construction odds and ends were being cleaned up and the main lateral was being primed.

On the Northport division the cleaning work was completed and the canal and laterals were tested out with water, but the irrigation demands were very light.

On the Interstate division main canal enlargement was in progress with the Bucyrus class 14 dragline and one Monighan dragline. One Monighan dragline and two P. & H. draglines were transferred from canal enlargement to drainage work. The replacement of wooden lateral structures with concrete on the third lateral district was being carried on by contract.

On the Fort Laramie division two electric draglines were employed on canal excavation on the Gering Valley work, two gasoline draglines and one electric dragline on drainage work, and one gasoline dragline on structure work. The Horse Creek siphon on the main canal was completed as well as one canal bridge and three headgates near by. A good start was made in moving camp to the Kiowa siphon. The Brown's Canyon siphon construction was started and the usual gravel hauling lateral excavation contracts were being carried on and miscellaneous small concrete structures, etc., were being handled in the same manner. All excavation for laterals between the Horse Creek lateral on the north and the main canal on the south and Table Mountain on the west and Kiowa Creek on the east was under contract at the end of the month. Surveys were being rapidly pushed with the idea of completing the location of all laterals north of Tunnel No. 3 by September 1, 1923. It was expected to complete the location of the Gering drain by July 1, 1923. The superintendent for the contractor on Tunnel No. 3 arrived on May 15 and the remainder of the month was spent in drilling for water at the north end of the tunnel with no success.

Advance crop report, Interstate Division, North Platte project, Nebraska-Wyoming, 1922.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay.....	27,662	Ton.....	47,097	1.7	\$8.00	\$376,776	\$13.62
Barley.....	3,932	Bushel.....	109,542	28	.48	52,580	13.37
Beans.....	144	do.....	1,383	9	2.40	3,320	23.05
Beets, sugar, and tops.....	10,614	Ton.....	142,052	13.4	6.30	894,927	84.32
Beets, stock.....	40	do.....	473	11.8	3.00	1,419	35.48
Cabbage.....	28	do.....	76	2.7	10.00	760	27.14
Clover seed, sweet.....	43	Bushel.....	230	5.3	7.00	1,610	37.44
Corn.....	11,614	do.....	213,890	18	.56	119,780	10.31
Corn fodder.....	333	Ton.....	1,520	4.6	2.50	3,800	11.41
Cucumbers.....	11	Pound.....				3,780	82.15
Garden.....	451					19,645	43.56
Hay, miscellaneous.....	722	Ton.....	552	.8	5.00	2,760	3.82
Mellons.....	7					575	82.14
Millet seed.....	26	Bushel.....	259	10	1.00	529	20.35
Oats.....	6,781	do.....	158,574	23	.40	63,430	9.35
Onions.....	10	do.....	1,100	110	.60	660	66.00
Pasture, alfalfa, and sweet clover.....	2,081				10.00	20,810	10.00
Potatoes, harvested.....	12,094	Bushel.....	1,487,363	123	.12	185,920	15.37
Potatoes, not harvested.....	1,218						
Rye.....	1,352	Bushel.....	3,579	10	.54	1,932	5.49
Wheat.....	7,810	do.....	135,449	17	.85	115,132	14.74
Miscellaneous.....	392					8,575	21.83
Total cropped.....	86,400	Total and average.....				1,878,450	21.74
Alfalfa seeding with nurse crop.....	5,226						
Alfalfa seeding without nurse crop.....	900						
Wheat, fall seeding.....	141						
Rye, fall seeding.....	13						
Less duplicated areas.....	5,380						
Total irrigated.....	87,300						
			Areas.		Acres.	Farms.	Per cent of project.
			Total irrigable area farms reported.....		105,000	1,340	92
			Total irrigated area farms reported.....		87,300	1,340	77
			Under water right applications.....		86,200	1,330	76
			Under rental contracts.....		700	10	1
			Total cropped area farms reported....		86,400	1,340	77

Advance crop report, Fort Laramie division, North Platte project, Nebraska-Wyoming, 1922.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay.....	2,106	Ton.....	4,818	2.29	\$10.00	\$48,180	\$22.87
Barley.....	413	Bushel.....	6,192	15	.50	3,096	7.50
Beans.....	70	do.....	516	7.4	3.00	1,548	22.11
Beets, sugar.....	391	Ton.....	4,240	10.85	6.30	26,712	68.32
Cane.....	11	do.....	36	1.06	3.00	108	3.18
Corn.....	3,600	Bushel.....	87,150	24.2	.50	43,575	12.10
Corn, sorghum.....	5	do.....	15	3.0	2.00	10	6.00
Corn fodder.....	84	Ton.....	306	3.6	3.00	918	10.93
Flax.....	64	Bushel.....	412	6.4	1.76	725	11.32
Garden.....	125					6,405	51.20
Hay, native wheat grass.....	744	Ton.....	616	.83	14.00	8,624	11.60
Millet seed.....	11	Bushel.....	368	9.2	1.00	368	9.20
Oats.....	3,900	do.....	98,230	25.2	.40	39,292	10.08
Onions.....	55	do.....	5,784	105	.40	2,314	42.10
Pasture.....	331	do.....			5.00	1,655	5.00
Potatoes.....	2,090	do.....	243,190	116	.30	72,957	34.90
Rye.....	59	do.....	253	4.3	.50	126	2.14
Seed, cucumber.....	39	do.....	7,950	204	.18	1,431	36.70
Seed squash.....	14	do.....	1,400	100	.25	350	25.00
Wheat.....	5,839	Bushel.....	65,011	11.1	.80	52,010	8.90
Miscellaneous.....	15					1,616	17.00
Total cropped.....	20,100	Total and average.....				312,040	15.42
Alfalfa seeding with nurse crop.....	1,766						
Alfalfa seeding without nurse crop.....	100						
Clover seeding.....	100						
Less duplicated areas.....	1,766						
Total irrigated.....	20,300						
			Areas.		Acres.	Farms.	Per cent of project.
			Total irrigable area farms reported.....		44,091	573	44
			Total irrigated area farms reported.....		20,300	573	20
			Under rental contracts.....		20,300	573	20
			Total cropped area farms reported....		20,100	573	20

A heavy frost on May 16 did considerable damage to the beets. The indications were that the acreage of potatoes planted on the project would be very light.—*Andrew Weiss.*

NEWLANDS PROJECT, NEVADA.

Although no serious frost damage occurred, the weather during a good part of May was cold and unsettled, retarding crop growth. Green aphids caused considerable damage to alfalfa. Grasshoppers increased rapidly in certain localities.

The Lahontan power plant was operated from the Truckee canal during the entire month. Delivery of irrigation water was heavy, especially under the Truckee canal when free water was delivered to May 10, in accordance with terms of public notice announcing operation and maintenance charges.

Ditches were completed and placed in operation to replace the Scott ditch through the city of Fallon. This ditch is to be filled in in connection with the paving of city streets, upon which work was in progress.

Work in connection with the new Lahontan power penstock consisted of opening up a tunnel for a distance of about 25 feet under the left spillway of the dam. Work was in progress at both portals of the tunnel. A force of about 30 men was engaged on this work.

Location of the feed canal for the Spanish Springs Reservoir continued with two parties in the field at the end of the month.

Construction of deep open drains under contract with the irrigation district continued with six drag-line excavators in operation. Over 6 miles of drains were excavated during the month, about 244,300 cubic yards of material being removed.

Fifty timber structures, involving 76,600 feet of lumber, were placed in drains.

One Ruth ditch cleaner was in operation cleaning laterals and a small Austin excavator was occupied cleaning shallow drains.—*J. F. Richardson.*

RIO GRANDE PROJECT, NEW MEXICO-TEXAS.

The rush of work on new laterals and extensions to meet demands for water service on new lands being brought in for the first time, continued to be one of the main construction features. In the Rincon Valley the only construction actually under way during the month was a small structure gang on lateral structures and a clearing gang preparing old lateral banks for the Ruth ditcher work. In the Mesilla Valley three excavators continued three shifts on drain construction, removing 202,890 cubic yards from 3.8 miles of drain. Two P. & H. 206 excavators were employed on lateral construction, placing 33,987 cubic yards in 4.8 miles of lateral and levee, and two Ruth ditching machines continued on lateral reconstruction moving 16,500 cubic yards from 8.3 miles of old ditches, some of which comes under operation and maintenance. In the El Paso Valley two Bucyrus excavators were employed on drain construction, excavating 146,939 cubic yards from 2.3 miles of drain. The Bucyrus 30-B excavator employed on lateral and levee construction moved 8,880 cubic yards in one mile, undergoing major repairs for the greater part of the month. A P. & H. excavator was used throughout the month on strengthening and widening main canal banks, placing 20,550 cubic yards in 13,500 linear feet of bank. The Ruth ditching machine on maintenance work bermed 9,680 cubic yards from 9.8 miles of single bank and two small

team crews were employed on lateral reconstruction and bank raising.

Practically all the first cutting of alfalfa had been made and nearly all cotton had been planted, much of it being replanted before making a stand. Nights were cool and cotton did not make the growth it should.

The project office has secured from the Army Air Service airplane photographic maps of a considerable portion of the lower end of the project which are very useful in observing the river channel, and can be used in checking up cultivated areas.—*L. M. Lawson.*

Prevailing crop prices at close of May, 1923.

Project.	Alfalfa hay, per ton.		Barley, per bushel.	Oats, per bushel.	Wheat, per bushel.	Potatoes, per bushel.
	In stack.	Baled at shipping point.				
Salt River.....	\$12-\$14	\$8-\$10	\$0.80	\$0.60	\$1.08	\$1.30
Yuma.....	15.00	11.00				
Orland.....	8.00	11.50	.60		.96	
Grand Valley.....	10.00	13.00		.70	1.15	.50
Uncompahgre.....	8.00			.75	1.20	.18
Boise.....	7.00	10.00	.60	.55	.96	.45
King Hill.....	8.00					
Minidoka.....	6.00	9.00	.96	.51	.99	.15
Huntley.....						
Milk River.....	8-9	11-12	.35	.60	.93	.60
Sun River.....	8.00	11.00	.72	.70	.92	.20
Lower Yellowstone.....			.40	.35	.96	
North Platte.....						
Newlands.....	10.00	15.00				.60
Carlsbad.....		14.50				
Rio Grande.....		18.00				
North Dakota pumping.....	10.00			.35	.94	.30
Umatilla.....		16.00				
Klamath.....			.77	.77	1.05	
Belle Fourche.....			.70	.45	.90	
Strawberry Valley.....	12.00	15.00	1.00			1.25
Okanogan.....						.60
Yakima.....						
Riverton.....	10.00	14.00	.95	.84	.88	.45
Shoshone.....		14.50			.80	.25
Indian projects:						
Blackfoot.....	10.00			.48	.99	
Flathead.....	10.00	14.00			.90	.45
Fort Peck.....				.50	.95	.50

¹ New.

CARLSBAD PROJECT, NEW MEXICO.

The weather was uniformly warm during May, with more than average high winds. There was no precipitation, and range conditions were below normal.

The regular maintenance force was kept to the minimum during the entire month. Continuous windy weather made it necessary to reclaim many ditches in the La Huerta district where sand drifted badly. Earth work was completed on the east embankment of the Main canal immediately above the East canal gates, where it had become necessary to strengthen the bank for a distance of about 1,000 feet owing to wind erosion. Minor repairs were made along the spillways at the Hackberry crossing, together with other short maintenance jobs at various points on the project. Minor repairs were also necessary on the concrete-lined section of the upper Black River canal. The maintenance force was engaged in cleaning C open drain at the close of the month.

The harvesting of the first crop of alfalfa hay commenced about the 20th and continued throughout the month. Owing to cold nights during the early part of the growing period the crop was rather light. The new crop was selling for an average of \$14.50 per ton

f. o. b. cars. Cotton was being planted during the entire month, as high winds had blown out the crop on sandy land. However, the cotton crop generally was up to a good stand with an average condition of about 70 per cent normal. The June crop report was in process of preparation.—*L. E. Foster.*

NORTH DAKOTA PUMPING PROJECT.

May was favorable for maintenance work, which was necessary, however, only in a small way. Two small crews were engaged almost continuously on lateral and structure maintenance and the canal system was placed in readiness for irrigation.

The power house had been brought into good condition, previously, and little additional work was required to make everything ready for the irrigation season.

New development work in the mine was completed, a new parting ready, track laid, and rooms turned off in the coal mine.

The date set for the opening of the irrigation season was June 1. Water was pumped May 31 and by June 1 water had been pumped through all the pumping stations, demonstrating the project's readiness to serve the farmers.

The usual commercial power operations were conducted. A demand for 6,000 kilowatt hours of electrical energy more than the corresponding month of last year was encouraging.

The Great Northern Railway granted a special tariff on sugar beets, which will enable Williston project to ship to the factory at Billings, and 10 plots of one-half to 2 acres were planted. It is believed this will be the beginning of sugar-beet raising on the project.

After a conference with the county commissioners, they agreed to replace a bridge across Little Muddy River, between Williston and the reclamation power plant, which had heretofore been built and kept up by the project. A good temporary bridge was built and a steel bridge promised in the fall.—*William S. Arthur.*

UMATILLA PROJECT, OREGON.

Conditions during May were normal, and crops made satisfactory growth.

During the month practically all the snow in the Blue Mountains went off. Toward the end of the month the Umatilla River fell rapidly and all the available supply was being diverted to the various irrigation systems. The Feed canal was operated throughout the month and Cold Springs Reservoir kept close to 49,000 acre-feet storage, in spite of the fact that 12,000 acre-feet was delivered to A canal. There was enough water in the Umatilla River throughout the month for the requirements of the Maxwell canal, east division, and Main canal, west division. The Hermiston drain was discharging close to 50 second-feet at the end of the month.

Farmers were busy irrigating and planting potatoes, corn, and gardens. Some cutting of first-crop alfalfa was done.

All canals and laterals of the distribution systems on both divisions were in full operation. Small maintenance crews on east and west divisions were employed in repair work and cleaning ditches. Wash-outs occurred on the A Maxwell chute and A spillway. These were repaired without interrupting service.

East division, supplemental construction, lateral extensions.—Under this feature 1,500 cubic yards of

class 1 and 65 cubic yards of class 3 material were excavated; 770 cubic yards of back fill were placed, 2,200 linear feet of 16-inch and 1,220 linear feet of 12-inch pipe were laid, and eight minor structures, containing 12 cubic yards of concrete, were built. The pipe manufacturing plant was operated during the entire month, and 1,686 linear feet of 12-inch, 3,444 linear feet of 16-inch, and 1,662 linear feet of 20-inch pipe were made. One timber bridge was built, containing 2,300 feet board measure of lumber.

West division, lateral system.—Work was under way on this feature during the first half of the month; 670 cubic yards of class 1 material were excavated, 2,000 feet of 15-inch pipe were placed, and four minor structures, containing 4 cubic yards of concrete, were built.

With good pasturage conditions in the coast counties, there was the usual seasonal lull in demand for hay. Some price offers were made for speculation, with no takers.—*H. M. Schilling.*

KLAMATH PROJECT, OREGON-CALIFORNIA.

May weather was cold and generally unfavorable for crop growth. The project canals were placed in operation on April 24; water deliveries were begun on May 1. The two Ruth ditch cleaning machines were engaged all month in cleaning ditches in the main division. Several small crews were engaged in repairing and installing minor structures.

In the Tule Lake division the work on the canal and lateral system for the first 10,000 acres had practically been completed. Studies and investigations were in progress to determine soil conditions and methods of draining these lands.

Hon. David W. Davis, Special Assistant Secretary, Hon. Miles Cannon, field reclamation commissioner, and Director A. P. Davis arrived at the project on the evening of May 1.

In the Langell Valley division the diversion dam on Lost River was completed. On the West canal work was begun on constructing Schedules 1 to 8 with dragline excavator. Contracts have been awarded for constructing the canal bridges, checks, and turnouts. Advertisement was being made inviting proposals for the construction of the lower end of the West canal and for the Dry Lake laterals. Advertisement was also being made for the purchase of the machinery for the hydraulic pumping plant at Dry Lake.

In the pumping division work was begun on enlarging the G canal. This work was being done by a class 14 Bucyrus. The width of the canal was being increased by about 8 feet and the depth 1.5 feet. A large part of the excavation was being done under water from 4 to 6 feet deep.

At the Horsefly dam site a crew was engaged all month in sinking test pits for the investigation of foundation conditions. On June 11 the proposed contract between the United States and the Langell Valley district will be voted on.

Nearly all of the settlers who filed on homesteads in the Tule Lake division had taken up their residence on the land. The settlers, who are all veterans of the World War, had built small houses on their homesteads and put a large part of their lands in crop. The new settlers seem to be well satisfied and are trying hard to make a success of farming.—*H. D. Newell.*

BELLE FOURCHE PROJECT, SOUTH DAKOTA.

May weather was too cool during most of the month for satisfactory growth of crops. Occasional showers

occurred which caused small grain to germinate and kept growing crops in good condition.

The Inlet canal was operated continuously and delivered to Belle Fourche Reservoir 27,787 acre-feet of water. Practically the entire flow of the river was diverted.

Water was turned into project canals on the 14th and continued to run for the rest of the month although the use was very light. Frequent showers discouraged irrigation but were of slight value except to garden and small grain.

On the 31st, Hon. Miles Cannon, commissioner of reclamation, arrived in company with District Counsel Beardslee for a couple of days visit. Plans were made ahead for meetings with farmers at Newell and Belle Fourche on the following day.

Most crops, although late, were making good progress and the prospects were bright for a satisfactory yield.—*B. E. Hayden.*

STRAWBERRY VALLEY PROJECT, UTAH.

May weather was generally cool and fair with subnormal precipitation.

The price of hay and grain advanced slightly during the month with little demand. The price of live stock, especially lambs, advanced with active market. Excellent stand of sugar beets was reported. Wheat was backward because of cold weather. Strawberries were on the market and a heavy crop was forecasted. The cherry and peach crops were light and the apple crop was normal.

Strawberry reservoir was filled to overflowing on the 18th, for the fourth time since the beginning of storage operations, and at the end of the month 400 second-feet were wasted over the spillway at Strawberry dam. The first sheep and cattle reached Strawberry grazing lands on the 17th and at the end of the month there were 2,200 head of horses and cattle and 17,000 head of sheep on the range.

The irrigation season began about the 10th; 20,000 acre-feet of water were delivered to the several divisions under the project; of this amount the High Line division received 8,320 acre-feet, the Spanish Fork division 11,267, and the Springville-Mapleton division 413. On the last day of the month the High Line canal was drawing 200 second-feet and the Spanish Fork River discharging 650.

The power plant was in continuous operation and power furnished under contract to the several project towns. A total of 88,042 kilowatt hours were consumed, for which revenues amounting to \$2,029.52 were received.

Assistant Secretary David W. Davis, Director A. P. Davis, and Commissioner Miles Cannon visited the project on the 20th.—*W. L. Whittemore.*

OKANOGAN PROJECT, WASHINGTON.

Weather throughout almost the entire month of May has been warm and dry, with the exception of a few small rains, the largest of which occurred near the end of the month. A light hailstorm occurred during the storm on May 25 which did a little damage to the apple crop. The damage is not believed to be serious.

Maintenance work was continued throughout May with a varying crew of men, and the canals were operated throughout the entire month for the delivery of water for irrigation. However, as a heavy rain occurred on May 25, about half the water was shut off, and at the end of the month nearly all the water being released from the reservoir had been cut off.

The mechanical force was engaged in making some further repairs to pumping plants and in the building of about 700 feet of transmission line and also in the starting of repairs to the Salmon Lake pumping units in order that early pumping might be started.

All of the 1922 apple crop had been sold and shipped and in some instances the returns were in. These returns were larger than were gotten earlier in the year, but they were still somewhat discouraging to the grower. The prospect for a good crop for the present year was bright, and it was anticipated that the tonnage would be about the same as for the past year.—*Calvin Casteel.*

YAKIMA PROJECT, WASHINGTON.

Granger Irrigation District.—At the end of May the manufacture of 33-inch reinforced concrete lock-joint pipe for the Granger siphon had been completed. Trench excavation was also completed. Hauling and laying of the pipe were about 93 per cent completed; jointing, 86 per cent; gravel back fill, 93 per cent; and earth back fill, 79 per cent.

Sunnyside division.—Delivery of water was continuous, with a heavy demand during the first half of the month, which decreased somewhat during the latter half owing to cool weather. The average diversion into Sunnyside canal was 1,199 second-feet. Two leaks developed in the canal near mile 46 and 48, but were discovered in time to prevent a break. On the 12th a heavy sprinkling tank and team belonging to Yakima County was backed into the canal at about mile 17.5. The accident was due to carelessness on the part of the driver. The team was drowned, but no damage resulted to the canal, although it took several hours of strenuous labor to remove the tank and team from the canal. Operation of the several pumping plants was uninterrupted except for short intervals at the Outlook and Rocky Ford plants to clean turbines. Maintenance work was limited to minor repairs and replacements on structures and canals.

Tieton division.—Diversion into the main canal reached 310 second-feet on the 5th and was maintained at this quantity for the balance of the month, with the exception of a 4-hour interruption on the 8th to permit repair of a leak between concrete segments below spillway No. 1. Water service to lands in the south half of the project was interrupted for about 24 hours on account of the failure of a joint of large steel flume near mile 7 on lateral G on the 7th. A force of 20 men was put on the job of repairing the flume, and water was turned back into the lateral at 5 p. m. on the 8th. Frequent showers and cool weather reduced the irrigation demand toward the end of the month. Maintenance work consisted of repair of flumes, installation of about 4,500 linear feet of wood, concrete, and tile pipe, sizes 6 to 12 inches, to replace worn-out concrete and wood pipe, and wooden flumes; telephone-line repairs, etc.—*J. L. Lytel.*

TIETON DAM.

The principal work during May consisted of placing 75,000 cubic yards of hydraulic fill in dam and the excavating of 16,000 cubic yards of rock from the spillway channel; 830 cubic yards of concrete was placed in the corewall.

Reservoir clearing continued with good progress.—*F. T. Crowe.*

RIVERTON PROJECT, WYOMING.

Except for one heavy rain and several showers during May, the month was favorable for construction.

Roads were generally in fair condition. The flow of Wind River was about 20 per cent above normal.

Toward the close of May the Wind River diversion dam was completed and all construction equipment safely removed from the site. About 10,300 cubic yards of embankment and 2,425 cubic yards of riprap were placed during the month.

The main work on the first division of the Wyoming Canal included the completion of about 1,400 linear feet of concrete lining just below the headworks, some excavation at the Midwest siphon by the Koehring drag line, together with the stripping of several gravel pits and the trimming of canal slopes between station 170 and Midwest draw preparatory to concrete lining.

Final location stakes were set for the 28-mile transmission line extending from the Pilot Butte power site in section 20, T. 3 N., R. 1 E., to section 21, T. 2 N., R. 4 E.—*H. D. Comstock.*

SHOSHONE PROJECT, WYOMING.

May was a cool, cloudy month with practically no precipitation. Weather conditions were excellent for construction work but rather poor for crops.

At the Willwood Dam the concrete work was completed, except for the bridge at the headworks section and some tunnel lining in the section underneath the concrete plant. Water discharged through the sluices the entire month with gradually increasing head, until at the close of the month the water surface back of the dam stood about 4 feet below crest elevation. The power outlet was open and water was discharging through it. The false work for one span of the bridge over the dam was completed at the close of the month. The class 14 Bucyrus drag line was operated on a three-shift basis on Willwood Canal excavation the entire month, completing the section above C-J coulee and stripping 1,200 feet below the coulee. Drilling operations were in progress on the section stripped.

On the Garland division work was carried on by a class 9½ electric drag line and a class 206 P. & H. drag line on open-drain construction in the North Garland area and an Austin trencher on closed drains in the South Garland area. Good-sized crews were employed on structure work connected with open-drain construction.

On the Frannie division a class 9½ Bucyrus electric drag line worked on open-drain construction in Sage Creek Valley east of Deaver and a similar machine was engaged on similar work west of Deaver. A class 14 Bucyrus drag line worked on the Mantua Flat principally deepening drains 104 and 124. A 206 P. & H. worked on the excavation of the upper end of drain 105. Several crews were engaged on structure work on the above drainage work, and one crew worked on gunite lining of the Deaver Canal southeast of Frannie, as canal operations permitting lining 1,100 linear feet of canal.

Crews were employed the fore part of the month on minor structure repairs and lateral cleaning on both divisions. A Ruth ditch cleaner on the Frannie division cleaned 3.15 miles of small ditches. Considerable repair work was also done on 114-F siphon. Water was carried in the canal system the entire month, but deliveries were light until the middle of the month. At the close of the month the main canal was being operated practically at capacity, with demand for water very heavy. This condition arose because of the cool weather the fore part of the month and the lack of rainfall. Crops in general were looking good, although somewhat backward. The Sho-

shone River runoff was retarded by the cool weather, but was more than enough for all demands.

The power system was operated throughout the month, delivering 120,450 kilowatt hours to United States uses and 11,600 kilowatt hours to commercial connections. The commercial connection at De Maris Springs was made on the 5th of the month and the Deaver-Cowley line for the Cowley commercial connection was practically completed on the 31st.—*J. S. Longwell.*

INDIAN PROJECTS, MONTANA.

BLACKFEET PROJECT.

During the first part of May the weather was exceptionally dry and rather unfavorable for the start of crops. During the latter part of the month, however, there were several rains, affording plenty of moisture for crop growth without irrigation.

Surveys were made in preparation for the proposed enlargement of the Two Medicine Canal and an extension of Four Horns reservoir outlet canal.

Construction work consisted of completing a timber check and diversion structure at the head of Four Horns reservoir outlet canal and placing several minor structures on the Two Medicine, Piegan, and Badger-Fisher divisions.

The Two Medicine and Badger-Fisher systems were operated, a total of 816 acres being irrigated. The Birch Creek and Piegan systems were not operated.

Maintenance work consisted of removing silt from 3,160 linear feet of upper end of Fisher Canal with a drag line and making minor repairs to canals and structures on the four divisions of the project.—*R. M. Snell.*

FLATHEAD PROJECT.

May weather conditions were good for crops. Construction work slowed up and roads were generally in bad condition at the end of the month. Temperatures for the month were below normal. Creeks have not reached a flood stage and run-off was small on account of the cold weather. Reservoirs were filling slowly and a sufficient supply for all divisions was believed to be assured. Crops generally were in fine condition and new seeding of alfalfa had made excellent stands.

About 8,000 acres were irrigated during the month; 5,250 acre-feet of water were delivered to farms. Fifty-six head of dairy cattle arrived in Polson on the 3d for project farmers. Cream shipment showed a large increase over preceding months and with a somewhat better price.

At the Hubbard dam, concreting was continued on one shift; 2,410 cubic yards were placed. Except for the ends the concrete in the dam was at elevation 3140. The gravel plant operated the entire month. An arrangement for washing sand and gravel was installed in the screening plant and was working successfully. A crushing plant was erected to provide crushed rock to supplement the gravel supply; 328 cubic yards of solid rock were taken out in foundation excavation. Two 10-ton stiff-leg derricks were shipped to the Black Canyon dam.

At the Ninepipe dam the heavy rainfall combined with machine trouble prevented good progress; 16,730 cubic yards of embankment were placed in dam and embankments. The Fresno outfit was increased to 10 in the latter part of the month. Ten wagons were used with the elevating grader.

Miscellaneous lateral work consisted in the constructing of a combined turnout weir and chute drop, one road culvert and a combined road culvert and

chute drop on Polson lateral C and 36 small structures elsewhere in the Mission Valley; 11,000 cubic yards of excavation were done by Government forces and about 13,700 cubic yards were excavated by farmers under contract.

The Ruth dredger operated on one shift up to the 16th and two shifts thereafter. Good progress was made cleaning ditches and excavation of open drains on the Post subdivision. Digging operations covered a distance of about $7\frac{1}{2}$ miles for the month.—*C. J. Moody.*

FORT PECK PROJECT.

May weather was excellent for general farming and planting of crops. However, the prevailing low temperatures during the fore part of the month retarded crop growth. Heavy rains on the last two days of the month were very beneficial to the crops and broke a long dry spell, continuing since last October.

Field forces were engaged in the operation of the four divisions of the project. A total of 852 acre-feet of water was delivered to 759 acres of land, requiring the operation of 52 farm turnouts and 71 miles of canals and laterals. A total of 11 minor structures were installed, consisting of 8 farm turnouts, 2 checks, and 1 measuring device. All canals and laterals that will probably be used this season were cleared of weeds. Canal banks were raised in a number of places, requiring 500 cubic yards of earth.

Crop conditions were below normal because of the cool weather. Practically all seeding had been completed except the planting of flax and corn. About 150 acres of alfalfa were seeded during the month. Live stock was in excellent condition.—*E. L. Decker.*

GENERAL OFFICES.

Washington office.—Director Davis was in the field the entire month, returning on June 2. During his absence the office was in charge of Chief Engineer Weymouth as acting director.

Assistant Director Bien was in the office the entire month except for a few days attending the annual convention of the American Association of Engineers at Norfolk, Va. Mr. Bien was elected second vice president of the association.

Chief Counsel Hamele was in the office the entire month.

Statistician Blanchard and Photographer Dame left for the West on May 8. Their trip will include the Columbia Basin, the Yakima, Grand Valley, Uncompahgre, and Rio Grande projects, and several Indian reservations. They will also accompany the President and Secretary Work to Alaska.

Purchases during the month amounted to \$8,822.86, and the value of the 269 requisitions filled and sales from the storehouse amounted to \$4,856.43.

Publications issued comprised 44 copies of the annual reports and 972 miscellaneous publications. The 21 mimeograph jobs amounted to a total run of 10,795 sheets.

The number of inquiries concerning the service and opportunities for settlement answered by the settlement and information section amounted to 437. At the close of the month the total number of inquiries from ex-service men concerning opportunities on the land totaled 198,891.

The photographic laboratory turned out work during the month to the value of \$132.15, distributed as follows: Washington office, \$71.85; field, \$16.85; sales, \$43.45.

At the end of the month the Reclamation Record mailing list totaled 17,601 names.

At the close of the month about 300 applications under the relief act had been received by this office. Up to May 10 the project offices had received 2,310 applications and it was expected that 2,690 additional would be filed.

Visitors to the Washington office included the following: Consulting Engineer D. C. Henny; W. W. Schlecht, former project manager, Yuma project; Mr. Stanislaus Spacek, technical attaché of the Czechoslovakian Legation; Mr. E. Ishikawa, civil engineer, Daido Electric Power Co., Nagoya, Japan; Mr. Spencer P. Miller, chief engineer of the Lidgerwood Co.

Denver office.—The chief engineer was in Washington, D. C., during the entire month of May as acting director. Assistant Chief Engineer Charles P. Williams was in the field at the beginning of May and during the month visited the St. Mary storage, Flathead, Sun River, Huntley, Shoshone, and Belle Fourche projects, returning to the Denver office on May 28. Assistant Chief Engineer R. F. Walter with Designing Engineer J. L. Savage left Denver on May 30 for Salt Lake City. Mr. Savage had visited the Riverton and Shoshone projects during the early part of May. Engineer James Munn left Denver on May 26 for the North Platte project and at the end of the month joined Messrs. Walter and Savage in Salt Lake City. Electrical Engineer J. M. Gaylord left Denver on May 25 for the Rio Grande and Yuma projects.

Official visitors to the Denver office during May included Special Assistant Secretary D. W. Davis, Director A. P. Davis, Reclamation Field Commissioner Miles Cannon, Messrs. E. E. Roddis, G. H. Bolt, N. E. Fordham, Foster Towle, J. N. Beardslee, R. B. Smith, C. B. Wentzel, and G. C. Imrie.

The principal work accomplished in the designing section during the month consisted of the following: Designs for the Black Canyon dam and drum gates, Boise project, were completed. Preliminary designs were prepared for variable radius arch dam at the Horsefly site, Klamath project. Preliminary designs and estimates were completed for Connolly dam, and detailed estimates were prepared for ultimate development and construction of the St. Mary crossing and Halls Coulee crossing on St. Mary Canal, Milk River project. Designs were practically completed for 96-inch lock-joint pipe siphon at station 5685, Fort Laramie Canal, and detailed designs were partially prepared for six cross-drainage culverts and eight concrete siphons, Fort Laramie Canal, North Platte project. Detailed designs were practically completed for check and by-pass structure at Pilot Butte power plant. Detailed designs for checks for winter power operation, Wyoming Canal, were completed and designs were prepared for sand gates at Pilot Butte power plant and at station 234+66, Wyoming Canal, Riverton project. Studies were made of precast Wandelken and lock-joint program for lateral system structures, Willwood division, Shoshone project. Designs were completed for drum gates, Tieton dam, Yakima project. New drawings were prepared for temperature equipment, deflection equipment, and deformation equipment for use in experimental investigations at Hubbard dam, Flathead project. Standardization work included the following: Detailed designs were prepared for standard 96-inch lock-joint pipe and elbow units; "40 series" drawings for 48 to 1 gate hoist with individual electric motor were completed. Detailed designs were prepared for forms for Wandelken turnout intake units.

The principal work accomplished in the electrical section consisted of the following: Drawings were

completed showing layout of light and power conduits in Black Canyon dam, Boise project. Detailed drawings were completed of the valve house of the Hubbard dam, Flathead project. Specifications were prepared and issued for the direct pumping unit for the Dry Lake plant, Klamath project. Specifications and drawings were completed and issued for the plate-steel penstock, Lahontan power plant, Newlands project. Memorandum and drawings were prepared covering the proposed repairs to the outlet works at the Pathfinder dam, North Platte project. Specifications were prepared and issued for the construction of about 30 miles of 33-kv. transmission line and drawings were approved for the electrical equipment for the Pilot Butte power plant, Riverton project. Contract was reviewed and approved covering the sale of power to the Cowley Gas Co., Shoshone project. Draft of contract was prepared for the purchase of electrical energy from the Montana Power Co. for operating electric excavators, Sun River project. Specifications were approved for the purchase of two 80-B Bucyrus electric shovels for McKay dam, Umatilla project. Studies were continued of the proposed power development at Boulder Canyon dam.

Among the more important matters which received consideration during the month in the legal department were: Delivery without charge of water from Spanish Fork River above 18 per cent as provided by public notice, Strawberry Valley project; changes in irrigable areas of farm units within irrigation districts, Lower Yellowstone project; operation and maintenance assessments on timber lands within irrigation districts, Lower Yellowstone project; lease of alkaline lands, Huntley project; right of way through city of Reno, Nev., and purchase of lands for Spanish Springs Feed Canal, Newlands project; right of way of Chicago, Burlington & Quincy Railroad Co. through Huntley town site, Huntley project; extension of time on payments of water-right charges from irrigation districts in State of Washington; confirmation of supplemental contract dated October 12, 1922, with El Paso County Water Improvement District No. 1, Rio Grande project; complaints in condemnation suits for lands required for McKay reservoir, Umatilla project; release from reclamation withdrawal of un-entered public lands within and near Paradise Valley irrigation district, Milk River project. The more important forms of contracts considered, prepared, or

Comparison between operation and maintenance estimates and results, January 1 to May 31, 1923.

Project.	Gross cost.				Net accruals and revenues.				Area paying charges.
	Estimate for 1923.		Actual cost to May 31.	Amount * over or under estimate.	Estimate for 1923.		Actual returns to May 31.	Amount more or * less than estimate.	
	Total for year.	To May 31.			Total for year.	To May 31.			
UNDER PUBLIC NOTICE.									
Belle Fourche.....	\$70,000	\$22,500	\$21,976	\$524	\$72,000	\$450		\$215	72,448
Boise.....	290,000	117,000	107,047	9,953	241,492	60,500	62,250	1,750	161,500
Carlsbad.....	40,000	19,500	18,350	1,150	55,550	22,000	21,650	* 350	25,000
Huntley.....	41,000	15,500	16,524	* 1,024	42,000	2,500		* 2,500	21,800
King Hill.....	33,515	13,000	4,651	8,349	33,515	24,861	24,791	* 70	10,000
Klamath (Tule Lake).....	12,400	2,400	1,175	1,225	12,443	2,110	1,000	* 1,110	9,920
Klamath (main).....	55,000	19,185	23,907	* 4,722	55,647	9,350	9,350		42,105
Lower Yellowstone.....	40,000	16,000	11,223	4,777	30,741	25,000	16,877	* 8,123	46,000
Minidoka (south side).....	94,000	37,555	30,241	7,314	99,300	6,860	6,500	* 360	48,000
Newlands.....	111,400	52,758	67,000	* 14,244	114,000	28,220	30,860	2,640	67,741
North Dakota pumping.....	32,900	(2)	(2)	(3)	102,167	(2)	(2)	(2)	7,653
North Platte (interstate).....	175,000	64,000	65,217	* 1,217	151,000	8,500	8,500		110,000
North Platte (Northport).....	24,000	6,300	3,600	2,700	124,000	3,600	3,600		15,000
Okanogan.....	52,200	14,910	16,200	* 1,290	54,100	4,610	10,400	5,790	6,918
Orland.....	33,000	16,200	15,700	500	33,618	10,600	10,600		20,174
Rio Grande.....	222,000	96,900	84,700	12,200	250,000	84,700	84,700		140,500
Shoshone.....	66,000	22,350	20,824	1,526	66,000	7,400	6,930	* 470	58,700
Strawberry Valley.....	* 25,000	9,800	8,350	1,450	49,200	3,500	7,000	3,500	46,846
Sun River (Fort Shaw).....	11,100	4,500	5,000	* 500	11,500	1,000	850	* 150	10,100
Uncompahgre.....	135,000	65,000	69,955	* 4,955	144,500	34,500	35,000	500	90,000
Umatilla.....	37,225	15,900	16,422	* 522	37,225	9,300	10,000	700	24,592
Yakima (Sunnyside).....	145,000	60,635	58,063	2,572	150,767	47,000	47,100	100	97,205
Yakima (Tieton).....	96,000	42,000	44,292	* 2,292	89,500	10,575	12,000	1,425	32,000
Yuma.....	290,000	120,000	121,800	* 1,300	292,500	113,000	136,000	23,000	63,200
	2,131,740	\$63,891	\$81,717	22,174	2,212,765	520,136	546,623	26,487	1,227,402
UNDER WATER RENTAL.									
Grand Valley.....	50,000	22,000	17,000	5,000	51,300	10,000	9,000	* 1,000	20,000
Milk River (including St. Mary).....	69,000	25,759	19,809	5,950	18,600	4,690	4,260	* 430	45,170
North Platte (Fort Laramie).....	90,000	35,000	31,102	3,898	90,000	31,102	31,102		46,000
Sun River (Greenfields).....	22,000	6,000	5,913	87	22,100				18,000
Total.....	231,000	88,759	73,824	14,935	182,000	45,792	44,362	* 1,430	129,170
INDIAN.									
Blackfoot.....	30,000	9,000	(2)	(2)	16,400	500	(2)	(2)	20,900
Flathead.....	55,000	18,400	16,780	1,620	54,500	4,000	2,550	* 1,450	35,000
Fort Peck.....	15,450	6,900	4,410	2,490	1,100	300	759	459	1,100
Total.....	100,450	34,300	21,190	4,110	72,000	4,800	3,309	* 991	57,000

* Returns regulated by district contracts.

* Not received in time for publication.

* Not including tunnel repairs.

* Includes installment of \$25,000 for tunnel repairs.

transmitted were: Proposed contract with Cowley drainage district for cooperation in construction of drains, Shoshone project; proposed contract for sale of water from Upper Klamath Lake for pumping to lands adjacent to lake, Klamath project; proposed contract with town of Powell, Wyo., for construction and operation of pumping plant by town on right of way for Garland Canal, Shoshone project; two contracts with Lars C. Lawrence for changing point of delivery of water under water-right application from Strawberry High Line Canal to Salem Canal, Strawberry Valley project; contract with Snake River Valley irrigation district for purchase

of storage water from Jackson Lake reservoir, Minidoka project.

An average of 435 letters per day were received in the mails and files section; the disbursing section handled 890 disbursement vouchers, involving an expenditure of \$319,530.75; in the purchasing section 426 advertisements were issued, 647 vouchers, involving a net expenditure of \$266,343.89, were prepared; 2,400 rates were furnished for basing purposes in awarding orders and making transfers, and 377 bills of lading were furnished for the movement of materials. The cost and property section handled transfers of material and equipment amounting to \$6,748.74.

SUMMARY OF CROP REPORTS ON RECLAMATION PROJECTS IN 1922.

NOTE:—These figures are limited to irrigated crops covered by crop census on Government projects proper, excluding dry-farm crops and all crops in most areas served stored water under the Warren Act.

Crop.	Acreage cropped.		Yields.			Crop value.		
	Total.	Per cent of cropped acreage, all crops.	Unit.	Total.	Average per acre.	Average per acre.	Total.	Per cent of total value of all crops.
Cereals:								
Barley.....	32,272	2.8	Bushels.....	1,044,294	32	19.06	\$615,283	1.2
Corn.....	53,732	4.6	do.....	1,511,781	28	16.70	897,595	1.8
Oats.....	42,030	3.6	do.....	1,231,553	29	14.86	624,751	1.2
Rye.....	1,263	.1	do.....	12,990	10	6	7,369	...
Wheat.....	159,573	13.6	do.....	3,790,734	24	21.41	3,417,624	6.8
Total.....	288,870	24.7		7,591,352	26	19.26	5,562,602	11
Other grain and seed:								
Alfalfa seed.....	21,557	1.9	Bushels.....	70,196	3.2	28.72	619,229	1.2
Clover seed.....	9,657	.8	do.....	47,191	5	39.50	381,485	.8
Grain sorghum.....	22,795	1.9	do.....	815,675	36	25.60	583,343	1.2
Flaxseed.....	290	...	do.....	1,521	5.3	10.40	3,006	...
Millet seed.....	87	...	do.....	1,011	11.62	15.17	1,320	...
Total.....	54,386	4.6		935,594	17.20	20.28	1,588,383	3.2
Hay and forage:								
Alfalfa hay.....	448,446	38.4	Tons.....	1,343,730	3	32.30	14,486,634	28.8
Clover hay.....	10,770	.9	do.....	18,180	1.7	12.17	131,074	.3
Other hay.....	22,180	1.9	do.....	27,057	1.2	10.49	232,657	.5
Corn fodder.....	4,120	.4	do.....	15,278	3.7	16.71	68,866	.1
Other forage.....	3,713	.3	do.....	18,640	5	32.07	119,095	.2
Pasture.....	107,203	9.1	do.....	...	...	10.98	1,176,693	2.3
Total.....	596,432	51				27.20	16,215,019	32.2
Vegetables and truck:								
Beans.....	4,102	.4	Bushels.....	58,589	14	44.76	203,610	.4
Onions.....	1,502	.1	do.....	386,397	257	113	169,648	.3
Potatoes, white.....	78,507	6.7	do.....	15,295,941	195	46	3,596,624	7.1
Potatoes, sweet.....	856	...	do.....	113,440	133	142	121,358	.2
Truck.....	23,510	2	do.....	...	...	125.70	2,955,304	6
Total.....	108,477	9.2				65	7,046,544	14
Fruits and nuts:								
Apples.....	26,747	2.3	Pounds.....	228,695,670	8,550	187	5,008,788	10
Peaches.....	1,997	.1	do.....	19,243,950	9,636	200	399,436	.8
Pears.....	4,201	.4	do.....	18,639,370	4,437	98	409,559	.8
Prunes.....	1,236	.1	do.....	9,051,900	7,324	132	163,324	.3
Citrus fruits.....	2,278	.2	do.....	14,972,000	6,572	328	745,540	1.5
Small fruit.....	2,156	.2	do.....	11,832,720	5,490	308	664,545	1.3
Miscellaneous.....	2,901	.3	do.....	6,551,360	2,258	108	312,945	.6
Total.....	41,516	3.6	do.....	308,986,970	7,442	185	7,704,137	15.3
Miscellaneous:								
Sugar beets.....	20,654	2.6	Tons.....	346,627	11.7	75	2,223,628	4.4
Cotton.....	147,340	12.6	Pounds.....	13,474,500	91.5	67	9,743,728	19.3
Cottonseed.....	2,636	.2	do.....	87,211,180	592	27.70	73,030	.1
Cane.....	6,415	.6	Tons.....	6,695	2.5	31.76	203,779	.5
Other crops.....	...	...	do.....	...	...	...	...	...
Total.....	186,045	16				65.81	12,244,165	24.3
Duplication.....	106,626	9.1						
All crops.....	1,169,100	100.0				43.08	50,380,850	100.0

ADMINISTRATIVE ORGANIZATION.

DEPARTMENT OF THE INTERIOR.

Hon. HUBERT WORK, Secretary of the Interior.
 EDWARD C. FINNEY, First Assistant Secretary.
 FRANCIS M. GOODWIN, Assistant Secretary.
 JOHN H. EDWARDS, Solicitor for the Interior Department.
 EBERT K. BURLEW, Administrative Assistant to the Secretary.
 JOHN H. MCNEELY, Assistant to the Secretary.
 JOHN HARVEY, Chief Clerk and Superintendent of Buildings.

BUREAU OF RECLAMATION.

WASHINGTON, D. C.

David W. Davis, commissioner; Miles Cannon, field reclamation commissioner; Morris Blen, assistant commissioner; Ottamar Hamel, chief counsel; J. B. Beadle, commissioner's assistant; C. J. Blanchard, statistician; Hugh A. Brown, editor and office assistant; C. A. Bissell, engineer; J. M. Luney, chief accountant; C. A. Lyman, repayment accounting; Miss H. A. Fellows and Raymond Dupue, fiscal agents; C. H. Fitch, chief clerk; Emmet Carr, purchasing agent; G. W. Numbers, appointment clerk; H. N. Blokel, Yakima, Wash., and W. F. Kubach, Denver, Colo., examiners of accounts.

DENVER, COLO.

F. E. Weymouth, chief engineer, Wilda Building, Denver, Colo.; E. F. Walter and C. P. Williams, assistant chief engineers; Miss L. H. Meisel, secretary to the chief engineer; J. M. Gaylord, electrical engineer; J. L. Savage, designing engineer; James Munn, engineer; W. A. Meyer, chief clerk; A. McD. Brooks, purchasing agent; Harry Caden, fiscal agent.

PROJECT ORGANIZATION.

Belle Fourche Project.—B. E. Hayden, project manager, Newell, S. Dak.; R. C. Walber, chief clerk.

Boise Project.—J. B. Bond, project manager, Boise, Idaho; Walter Ward, engineer in charge construction Black Canyon Dam; E. R. Mills, chief clerk; C. F. Weinkauf, fiscal agent.

Carlsbad Project.—L. E. Foster, project manager, Carlsbad, N. Mex.; V. L. Minter, chief clerk and fiscal agent.

Grand Valley Project.—S. O. Harper, project manager, Grand Junction, Colo.; W. J. Chiesman, chief clerk; A. H. Hall, fiscal agent.

Huntley Project.—A. R. McGinness, project manager, Ballantine, Mont.; H. S. Elliott, chief clerk; Miss M. C. Simek, fiscal agent.

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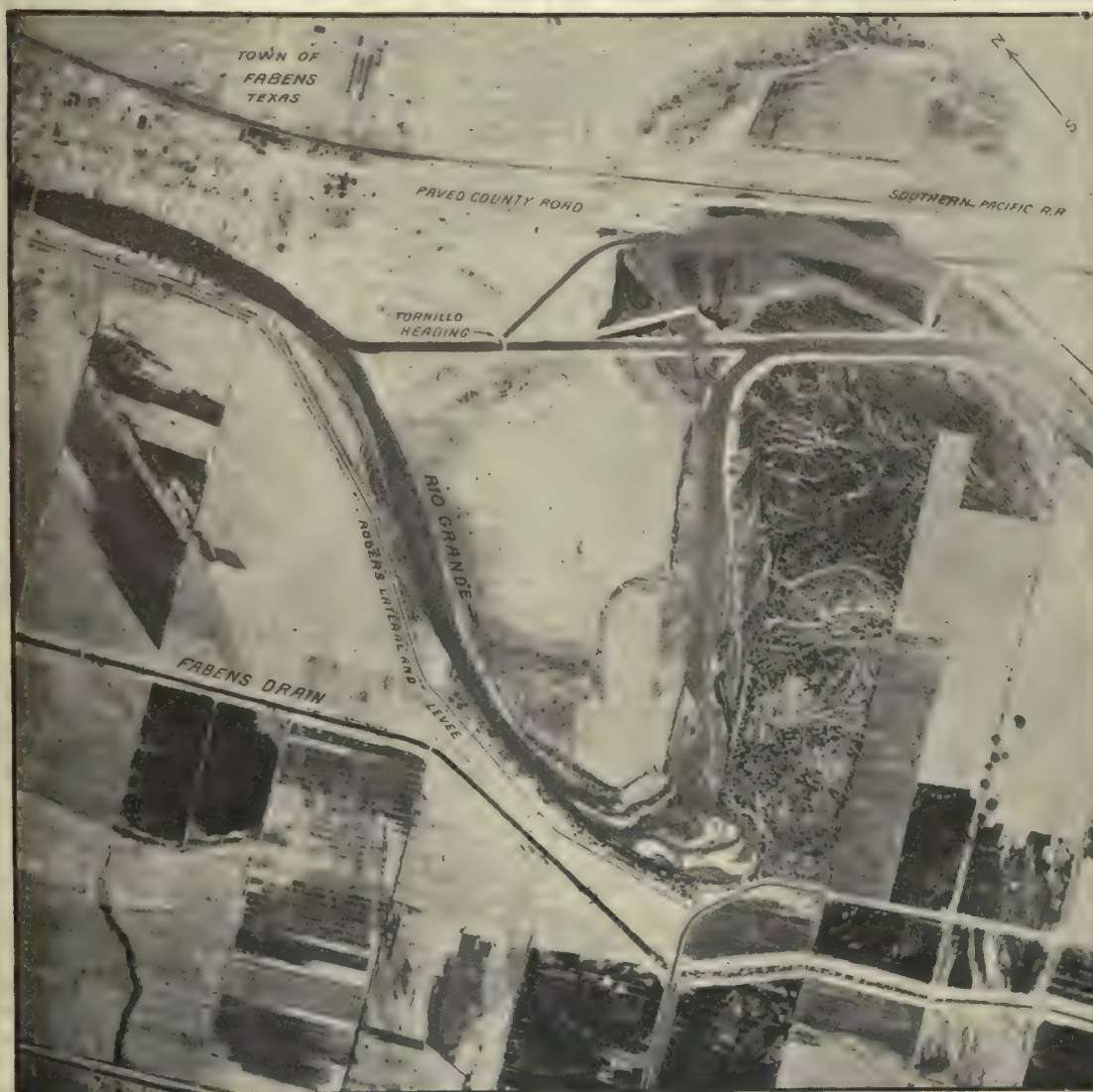
The Reclamation Record

Issued Monthly by the BUREAU OF RECLAMATION, DEPARTMENT OF THE INTERIOR, Washington, D. C.

VOLUME 14, No. 7

Price: 75 cents per year

JULY, 1923



Aerial photograph taken by the Army Air Service showing the new Tornillo Canal heading at Fabens, Tex., Rio Grande project.

PRESIDENT HARDING DISCUSSES IRRIGATION PROBLEMS.**Extracts from Speech at Spokane, Wash., July 2, 1923.**

IT has been in my mind during these days of travel in the West to express on some appropriate occasion a few views regarding those problems which we summon to our minds under the headings of conservation, reclamation, and development. Nowadays I think there is a disposition to change the order of terms and mention development first. Not that we are any less devoted to conservation, but there is an increasing realization that in our national development we have reached the time when wise programs for development in all parts of our domain must be encouraged.

Traveling about this country, and somewhat also in other countries, I have been constantly impressed that wise development of natural resources does not often result in their disastrous diminution. Rather, it seems as a rule to result in a growing, an expanding, an increasing supply and variety of the very riches upon which we make drafts.

I do not fear that present development is liable to impoverish us in the future. The precise contrary, according to every historical analogy, is what will take place.

So, contemplating the certainty that another century will give us a population of probably 300,000,000, one is forced to conclude that wise development of resources is the only policy to which we dare commit ourselves. There was a time when the public domain was thought of as a treasure house of potential wealth to be locked up against the day when we should need it. It was assumed that by locking it up we should make it surely available whenever it was required. As a matter of fact that would prevent it from being ready when needed. Development must be gradual; a business of the decades and the centuries. It should, indeed, be given wise direction and supervision. The opportunities of the newer country should be so administered as to insure their equitable distribution in the future. We have done with the era of thoughtless and reckless exploitation of our domain. There will not again come a time when imperial estates will be distributed with lavish hands to enterprising gentlemen whose only claim is that they would like to own them.

We want the West to be a land of homes and of the freest opportunity for the establishment of the families possessing independent means of livelihood. It is recognized that the very different conditions of the plains and mountain areas compel many modifications of the policies that have served so well in other parts of the country. Those modifications are being wrought out gradually with a view to promoting here

that wide diversification of industries and occupations which is invited by your variety of resources, and which is the ideal state of modern society. It is not desirable that the West should fall into the hands of bonanza corporations, seeking to exploit it for the profit of stockholders who live somewhere else. But, on the other hand, it is worth while to emphasize that many of the most valued resources of the West are of such character, and their development must be on such a scale that they can only be made available under concentrated management and by the use of capital in large units. We must enforce measures which will give capital and management attractive returns, but which will always keep in sight the primary purpose of dealing out justice, even-handed opportunity, and an absolutely fair interest in the product of human industry, effort, and intelligence.

I spoke a moment ago of the fact that as a rule the utilization of nature's resources commonly results in their increase rather than their diminution. That is peculiarly true of one especially valuable resource of your mountain West; I mean your water. The flow of a great river that runs away to the sea without being utilized for power or for irrigation is wasted forever. To prevent its development is not to save it for the benefit of a distant future. If it is to be of service to-morrow it must be harnessed to-day.

Our whole view of the relation of water to western development has changed much in the last generation. Only a few years since these waters were looked upon as potentially useful merely for irrigation and agriculture. We entered upon a great program of irrigation enterprise in that era when we had as yet but a vague notion about the dual purpose that your water resources ought to serve. But now we know that the same water can in most cases be utilized both for power and irrigation. Thus the great power development will mark the sites of industrial centers, adjacent to which will grow up rich areas of intensive agricultural production. The industrial populations will provide markets, without impossible transportation expenditure, for the products of the soil; and in turn the people on the soil will afford markets for the products of industry.

Transportation will be increased and cheapened through electrification of the railways; and in the light of what we now know about all aspects of this subject, we may confidently look forward to a generation in which these young and vigorous Commonwealths of the West will boast as great a population as the entire Nation numbers to-day, capable of living for the greater part within itself, representing the

widest variety of occupations and interests, and having its problem of transportation largely solved for it because it will be so nearly self-sufficient and self-contained.

Western people have had reasons to complain that there is not always a sympathetic or understanding attitude in some other parts of the country toward the irrigation development that the West must have. You people of the inland empire might well remind your critics that during the uncounted centuries when the greatest civilizations had their seat on the Euphrates and the Nile they were nurtured by an agriculture which depended on irrigation; on conserving and utilizing the waters of a few great streams. Our irrigation program is after all only a proposal to repeat on the scale of modern engineering operations the works by which primitive man learned to subjugate the earth and make it serve the needs of a developing social order.

Not once, but a hundred times over, will we reproduce here in the plains and mountains and valleys of our West the wealth and productivity which enabled the Pharaohs to build monuments for the wonder of all times. But the monuments to our achievements will bear inscriptions telling not of the slavery and sufferings of generations which gave their lives to perpetuate the glory of a tyrant. Our inscriptions will tell of great, free States made up of contented, cultured, and Christian homes.

I am sure you are interested in what the Federal Government can do to help solve the problems on which your future so largely depends. As we have gone onward in reclamation there has been impatience that we could not proceed faster. There have been disappointments in the progress of work involving intricate and diversified engineering and hesitant financing. But I have been heartened by the convincing evidences I have already seen of the wonderful results where water meets the land.

The Government is interested to aid your efforts, from the standpoint of adding to the national wealth, by the transmutation of arid spaces into fertile fields. It is interested also in the protection of the national finances, so that money advanced to prosper this work may not be dissipated in doubtful projects or jeopardized in experiments. We must look for plans that are safe; plans so conceived that they will not unduly burden the settler in the days when he is reducing the land to production; plans that will be reasonably broad, and that will not commit the Government to unwise or unreasonable expenditures.

I have been pleased to commend the subject of extended reclamation to the consideration of the Congress, mindful of the fact that reclamation from the national viewpoint must be considered as an investment of funds which will at length be returned to the Government. The Government's part is to supply

expert engineering service, to advance finances for enterprises too vast for private capital, and to supervise and safeguard the work so that the balance of fair dealing may be maintained between Government and settler, until the dream of an enlarged West comes true.

I have seen the statement that if the projects under investigation by the Reclamation Service be finally approved and completed, an area of cultivable land will be added equal to one of our largest agricultural States. A proposal to create the equivalent of a new State is something to challenge the conquering spirit of America. We know that the task one day will be done. It is for us a question of method; of proceeding with such business judgment and on such sound principles that the future may look back and say that it was well done. Of all these problems we are particularly reminded in this region, because the Columbia conveys to the mind significant suggestions.

It is a matter all the more compelling, because the same waters which bring wealth to the soil also pulsate with power for your cities, your railroads, and your industries. The use of the streams for power is inevitably tied in with reclamation. One purpose supplements the other in fulfilling the destiny of the waters as they flow on their way to the sea. And there are yet other uses for your waters. We must see that the navigable waterways are maintained; and here again we find that the benevolence of the Creator has provided means to advance the projects of man. Frequently it is possible to improve navigation as an incident to developing power and irrigation works. Moreover, we want the flow of the streams for these great purposes, national purposes all, conserved. In other lands has been taught the lesson of waste that followed denuding the forested slopes and permitted erosion to end its work in flood and devastation. We in America must not be so thoughtless or profligate. We must have a policy of reforestation that will preserve the national interests and at the same time permit use of the timber as it is needed.

So we see how the discussion of reclamation naturally leads on to that of water power; and then to the maintained navigability of streams which carry commerce; and on again to the need of saving, while utilizing, our forests. It is a many-sided problem, in essence a problem of protecting the common good. The Government comes in neither as an interloper nor as a benevolent carry-all, but in its legitimate relation, under the Constitution, to these truly national concerns which touch so intimately the people of this inland empire of the Pacific coast, of the West, and of the entire United States.

During the recent plague of grasshoppers on the Klamath project, Oregon, large flocks of sea gulls appeared and waged vigorous warfare on the hoppers.

FILMING THE COLUMBIA BASIN PROJECT.

By C. J. Blanchard, Statistician.

THE Northwest, from Minneapolis to Seattle, never presented a fairer spring countenance than it does this season. Wide vistas of rippling grain fields and the Great Plains, a sea of emerald, attest the abundance of spring showers. The dry farmers of western Dakota and eastern Montana, Washington, and Oregon are jubilant over the prospect of bumper wheat crops. Live stock on the range never looked in better condition.

In the towns and in the country optimism has replaced the pessimism of the past two or three years. Mining camps are running full blast, and in the timbered regions the logging and sawmill operations are begging for more laborers. The outlook everywhere is cheering.

In making our photographic survey of the Columbia Basin a rare opportunity has been afforded us for personal study of those conditions in four great States. We have enjoyed contact with individuals representing all sorts of industries and avocations. Our impression is that the Northwest is coming back to normal this fall with a whoop.

A pictorial reconnaissance of the watershed of a great river like the Columbia is a real adventure. Ours has taken us at times far from the beaten paths into the heart of the wild. We have climbed the mountain, descended into profound canyons, slept in the forests beside the blue lakes and in the desert. It has all been revealing and has quickened our appreciation of the manifold bounties which nature has bestowed upon our country.

We left Spokane by auto on May 13, with Assistant Secretary Goodwin, Homer Gault, engineer, Messrs. Parker and Bryan, of the Geological Survey, and Fred A. Adams, of the Columbia Basin League. Our first stop was at Newport, Wash., where we visited and photographed Albany Falls. Pend Oreille River at this point roars through a narrow gorge between high basaltic cliffs. A series of foaming rapids culminates in a double waterfall produced by a rock island in the river. One of the proposed dam sites is at this point. Views of the official party inspecting the site were taken, to be used in connection with the film scenario of the basin now being assembled. We said good-by to the party here and under direction of Mr. Adams, of the league, began the long journey up the river to its source in Glacier National Park. We followed the Pend Oreille for many miles in the midst of wild and beautiful scenery, and near the summit of Laclede Hill, over which a fine highway has been constructed, we filmed the stream far below

us. The reflections of mountains, forests, and clouds were perfect. Sunset hour found us at Sandpoint, Idaho. The sun was just about to drop behind the range when we drove out on the 2-mile-long bridge across Lake Pend Oreille and caught the farewell with its silver and golden glints on the water.

On Monday, May 14, the early morning found us waiting at the landing above Sandpoint for the ferry across the lake. Construction of the new State highway around the north shore forced the use of a ferry for a 10-mile distance. Six cars were loaded on a barge. The little stern-wheeler backed offshore and then headed up the lake at a 7-mile-an-hour clip. The beauty of the morning scene was indescribable. Pend Oreille Lake is one of our larger inland seas and rests in the heart of some of the wildest and most rugged mountain scenery in the West. Towering peaks, their summits in snow and clouds, rise sharply from the shores. The lake has many wide bays and numerous islands, and its waters are sapphire blue in color.

In the afternoon of the 14th we were thrilled by a storm scene on the western slope of the Cabinet Range. All the morning the sun and the storm clouds had been engaged in preparing for a battle. Out of the east and north the regiments of clouds came storming the heights and covering them from view, but the sun's forces each time would drive them back. At 3 o'clock masses of heavy black clouds rushed on the mountains, enveloping them almost to their bases. A cold breeze sprung up, calling for overcoats. For an hour the sun strove in vain to drive through the darkness in the east. Then victory came. As if by magic the blackness faded from the clouds and soft grays appeared. Through this the sun darted fiery rays and specks of blue sky began to show in the east, growing larger and larger. Finally the summits of snow caught the brilliant beams of light and glowed again with silver sheen. During that brief interval of darkness a heavy fall of snow had occurred. From the lower levels the mists began to roll up the mountain sides. Nebulous and fleecy, folding in and out, the mists crept up to the line of afternoon sunshine and then were quickly dissolved.

Evening of May 15 found us at Thompson Falls, the site of a large power development on Clark Fork of the Columbia. This power is largely utilized in the operation of the Milwaukee railway system. Clark Fork is a noble stream and flows through a picturesque country. The falls have been destroyed

by the diversion dam, but the rapids below furnish a fine picture. We followed Clark Fork to the junction with Thompson River, and soon after turned to explore the latter stream. That night we lodged with a ranchman in the forest, and just at sunset watched the white-tailed deer come down to the pasture. Early next morning we reached the big salt licks along the Thompson and set up the camera, hopeful that the deer would come down to be photographed. They did. Down the trails they came, singly and in pairs, perhaps 20 or more of them, mostly white tails. As they approached the lick their heads went up and they hesitated. Dame stood motionless beside the movie camera. Finally a doe appeared from the lower end of the swamp and walked directly toward the camera. In a few moments three more, one a good-sized buck, came quietly down and began licking the salty earth. Dame got busy with the crank, but the deer were not much disturbed. After taking a number of poses and a dozen still views, the photographer, wanting more action, shouted "Beat it." With loud snorts the deer jumped for the bushes and started for the hills. Their fright was not great, because two came back while the loading up was going on and remained unconcerned when the auto went by on the road.

In the afternoon we penetrated the Cabinet National Forest, riding for miles along the wave-washed shores of Lake McGregor, and at 7 o'clock reached Kalispell, on the edge of Glacier National Park.

In the early morning we started for Lake McDonald in the park, reaching the lake in time for good lights on the snowy peaks which rise all about the lake. The great peaks—Stanton, Cannon, Brown, Edwards, and Gunsight—were bathed in strong sunshine and the snow masses gave back a brilliant light that was painful to the eyes. The lake was rough, which prevented reflections, but gave us good pictures nevertheless. We followed the shores as far as the auto road was open and found interesting viewpoints everywhere. As our scenario can show only flashes of the beauty spots, we could not linger in the park and made our departure regretfully just after lunch, reaching Flathead Lake that evening just ahead of a heavy downpour which drove us to shelter in a lodge on the shore of the lake near Somers. Here we were held all next day by the storm. The Flathead scenes are disappointing owing to the dark skies, but we were able to stage a fine one at Big Rock Falls Dam site in the river below Polson. Thanks to the kindness of Mrs. Lewis, a member of the Flathead Tribe, dressed in beautifully beaded deerskins, we filmed the falls as she blessed the waters in true Indian ritual.

We obtained a striking storm scene on Mount Harding, near St. Ignatius, the same evening. On the following day we began our return trip to Spokane, getting pictures along Clarks Fork, on the Missoula,

and at evening reached Thompsons Falls. An evening drive brought us to Hope, Idaho, on the shores of Pend Oreille Lake. This is one of the great lakes of the Northwest, but its shores have been denuded largely of the fine natural timber and are unsightly with stumps and driftwood. Hope, Idaho, straggles along one street on the hill beside the lake, a town once booming during the days of big lumbering, but a dead one now. Main Street presents a pathetic picture, with its tumbled-down shacks, its empty stores, and deserted houses. When you go east you lose an hour at Hope, but returning to the west you get it back again. But in this town, which has gone to seed, gain or loss of time concern the residents not at all.

From Sandpoint the next day we drove out to the Telache lead and silver mine, which is on the shore of Coeur d'Alene Lake, on the northern edge of the richest lead zone in the world. Idaho is one of our largest producers of lead, and this small area in the panhandle contributes more than 60 per cent of the entire output of the United States. At Sandpoint we photographed the large Humbird sawmill and log supply, and in the afternoon on Priest River filmed logging scenes. A delightful night was spent at Priest Lake, another proposed reservoir of the project, and here we got an interesting stream gauging scene at the outlet.

After returning to Spokane we photographed the falls, the city, the siphon crossing on Spokane River at Millwood, and the dam site in Latah Valley. Later pictures were obtained of Bonnie Lake and Rock Lake, two additional reservoirs under consideration. Our plans now are to survey the basin itself, covering the irrigable areas from Quincy, on the north, to Pasco and Walla Walla, on the south, with side trips to Okanogan, Wenatchee, and Yakima. These will be described later.

The magnitude of the Columbia Basin project is most impressive and can not be covered in this rambling statement of our daily work in photographing it. The watershed is enormous and the rivers drawing it are among the greatest in our country. The scenic attractions for the tourist are unexcelled and have an added lure for the adventurous in that they are for the first time now accessible to all by reason of the good highways. One thing is certain—there is no question as to the abundance of the water supply of this region.

On our trip over the Flathead this spring we were much impressed with the change for the better in general farming conditions. A much larger acreage is going into alfalfa and diversified crops, the area in wheat is much reduced, and the increase in numbers of dairy cows, pigs, and chickens is notable. A number of new farmers have come in, and as a class they are good practical farmers. Of course, the old-timers are holding too much land, and there is need and opportunity for many more real farmers. The Flat-

head project has not measured up to its opportunity by any means yet, but is making real progress.

This promises to be a strenuous summer for the statistician and the photographer. After completing the scenario for the Columbia Basin, Secretary Work, who is greatly interested in motion pictures as a means of acquainting the public with the larger activities of his department, has arranged for our visiting Alaska with President Harding's party. It is planned to obtain a number of reels showing Alaska, her resources, scenery, and the new Government railway, which now makes accessible for the tourist some of the most wonderful scenery in the world. Secretary Work is going to bring Alaska into the United States and not leave it where it so long has been, an orphan and viewed somewhat askance by most of our citizens. The films are to show Alaska as it is—a huge empire of vast potential possibilities and offering boundless opportunity for the genius and intelligence of Americans in development and investment.

Returning from Alaska, our friends on the Yakima, Uncompahgre, Salt River, and Rio Grande projects are calling for pictures. In addition, Secretary Work has approved cooperation with the Park Service, Indian Bureau, and with the East Las Vegas Highway Association in securing pictures.

Our first proofs on Columbia Basin watershed are gratifyingly good. We had so many cloudy days with rain and snow that our minds were troubled about quality of work. On Yakima, Okanogan, and at Kennewick, Pasco, and Wenatchee we had the finest photographic weather imaginable. The Kennewick and Pasco region was in the midst of harvesting the biggest crops of strawberries ever known here. The crop is handled largely through a growers' organization, which is functioning most efficiently and is bringing good prices for the members. Many Umatilla Indians are employed as pickers and earn good wages.

PRACTICAL SUGGESTIONS FOR POULTRY FARMERS.

By H. O. Numbers, Secretary Pennsylvania State Poultry Association.

UPPERMOST in importance to-day is the problem of standardization as applied to all farm products. The poultry man will readily see the benefits by reading the market reports in the papers. To many poultry raisers these figures are not comprehensive and mean nothing, but to others there is a desire to know how to grade and how to receive grade prices.

Let us consider some advantages by grading eggs. First, from the producer's point of view; the man who sells large fresh eggs on the common market ordinarily receives the same as the one who sells small or mixed eggs of questionable age. By having a fixed standard the aggressive poultry farmer will be compensated to the extent of the quality of his product. Size, weight, freshness, color, and shape are the most important requisites in standard quality.

The following score card has been used for the past three years at the Pennsylvania State Farm Products Show:

	Points.
Freshness	35
Weight	25
Condition of shell	20
Color	10
Shape	10
Total	100

The buyers of eggs pay in accordance with the relative weights expressed in this table. It pays to

standardize your product. Another point not to be overlooked is candling of eggs. In order that high-class trade may be held it will be necessary to candle your eggs for blood or meat spots. These spots do no material damage to a fresh egg, but they are repulsive to the consumer. Eggs that weigh less than 22 ounces to the dozen should not be classed in the fancy grade.

By analysis of the score card we find freshness with a weight of 35 points, or more than one-third the entire scale of points. Eggs after being gathered and held for market should not be subjected to a temperature of over 65° or under 40° F. A clean, well-ventilated dark room is the proper storage place. Most markets can be supplied twice a week, but if it is necessary to hold eggs longer they should be turned daily to prevent the yolks from settling or adhering to the shell. A fresh egg will show scarcely any air cell.

Next to freshness we find weight with a scale of 25 points. The dozen of eggs that weighs 22 ounces is not worth as much as the dozen that weighs 32 ounces—surely not when there is a difference in weight of 45 per cent. Yet ordinarily the farmer who does not grade, and who has large, fresh eggs, is losing heavily if he sells on the open or common market.

Condition of shell is an important factor. A good firm shell will carry in first-class condition, but a thin

shell, or one poorly formed, with cracks and streaks, will break in transit and soil the rest of the shipment. Good, firm shells are necessary to carry the contents of the egg.

Color and shape are of minor importance, yet they play a part when the buyer wants either white or brown eggs of uniform shape.

Let us consider the problem from the viewpoint of the consumer. When he buys eggs, he wants fresh eggs. Of what use is a stale egg? In all the formulas and recipes, I have never seen where stale eggs were required. The consumer pays good money for a good wholesome product and he should have it. The people who buy graded eggs are a discriminating class. They want quality and are willing to pay for it. As the prices for graded eggs are listed, the consumer gets

value received for either a 22-ounce dozen, or a 32-ounce dozen. That is fair.

The consumer does not want a dozen eggs with one thin-shelled egg in it. Neither does he want a single cracked egg. He wants 12 dependable eggs to every dozen.

Color is a matter of preference. The food values are the same in white and brown shelled eggs, with a small fractional part in favor of the brown-shelled egg, which, however, is negligible.

Uniformity in shape or rather normal shaped eggs are required. An ill-shaped egg in a package spoils the looks and interferes with sales.

Now to summarize the problem, we find that grading to a standard produces profit, health, and satisfaction.

PROJECT WOMEN AND THEIR INTERESTS.

By Mrs. Louella Littlepage.

Vacation Land.

WHERE is it, this unknown country to so many farm women? America is beginning to know how to play, but there is still a pitifully large percentage of the class that needs recreation most who seem unable to make the grade. The lack of money is usually blamed for this, but in many cases the lack of initiative is nearer the truth.

The restful shade of forests, the majesty of mighty mountains, the charm of lake and stream rightfully lure us, but to the versatile woman vacation land may be found very, very close at hand.

We have in mind a woman who had worked her youth away, toiling early and late that the farm might be paid for; that her children might be nicely dressed and educated; that they might enjoy outings which she had learned to do without, until one day it dawned on her that her family was learning to do without her. If you knew the fighting stock from which she came it would be perfectly useless for me to tell you that she did not sit down and make a martyr of herself. But she did sit down and think. She must be more attractive and more companionable. A tired woman is always irritable in spite of herself, and an irritable mother means a whole family with nerves and tempers on edge.

The next morning she threw a bombshell into the camp by announcing that early the following week the entire family would take a vacation. On the far side of the home "forty" a heavy growth of willows fringed the banks of a little stream, and in the shade on the opposite side, completely screened from the farm buildings, the camp was made.

An old Army tent furnished sleeping quarters, and comfortable chairs, benches, hammock, and folding card tables made the spot restful. The children took turns in doing the necessary chores back at the homestead; they likewise worked turn about in preparing the meals. It was something higher than selfishness which prompted mother to take a complete rest during this outing. Boy Scout friends from the near-by town and a cousin belonging to the Girl Reserve Corps were invited to join the party, and the whole camp was soon on a scientific basis. It was such fun cooking potatoes and roasting ears of corn in the ashes and broiling bacon and planking fish that the children eagerly took their turn in preparing surprise meals.

Mother took time to read and wave her hair and make dainty collars for her gingham gowns. In the evening they toasted marshmallows or spent wonderful hours under the stars when mother told stories of her youthful days. There were fishing parties, in which she joined, although the wriggling worms and flopping fish filled her soul with panic, but she sensed the spirit of the old lines:

Fishin' is something much more to me
Than bait and tackle, and hook and line.
Fishin' is gettin' right next to the tree,
And the bloom, and the bird, and the bush, and the vine.

Fishin's the glory of bein' out there,
To hear the leaves talkin' and whisperin' away,
And gittin' my heart full of beauty and air,
And feelin' more love when I kneel down to pray.

The little mother confessed that it was the first time she had really "seen" a sunset in 18 years. Just think of it. And she was on the sunny side of 40 at that.

Neighbors began dropping in, first from curiosity, and later for real enjoyment, and the camp became so popular before the two weeks had passed that the next year quite a colony of tents were grouped in the old pasture.

Almost every reclamation project embraces its own enchanting recreation spot, or within easy reach may be found forests or lakes or mountain retreats where any farm family, as a whole or in relays, can go for a few days and "let go."

Monotony is deadly and the toxins of fatigue are now recognized as a real menace to health.

Turning Gasoline into Milk.

One of the finest things about El Paso is the spirit of cooperation which the citizens of that city always display in any campaign for public welfare or in fact any of their numerous projects for advancement. Just now there is a fight on to reduce infant death rate, which is aggravated in that section by the large population of foreign origin. Fine unselfish service is being performed by the city and county health authorities, charitable institutions, individuals, and public clinics in saving babies' lives.

There is the usual cooperation of various organizations in furnishing nursing and medical treatment when needed, fresh air camps, providing milk for babies suffering from malnutrition, and giving instruction in clothing and feeding infants, and recently there were contributions from totally unexpected and unique sources.

One of these was the president of an oil company who offered to turn over to the baby milk fund all the cash—not the profits—received at the company's 12 filling stations for all gasoline and oil sold to autoists during a certain period on Sunday. The fame of the offer spread, and when the day came El Paso autoists thronged the stations. Churchgoers stocked up on their way to service; picnickers starting out for the day stopped for a supply, and motor trippers timed their departure so as to visit the company's stations and fill their machines to the brim with oil and gas. Hundreds of dollars worth of milk were provided for from the gasoline and oil sold.

The day before the "gasoline miracle" the women of El Paso engineered a tag sale on the streets of the city and a large percentage of El Paso's population gave up their dimes to purchase milk and supplies for the Mile-high sanitarium where hundreds of little emaciated forms, all skin and bones, are being rounded into plump, healthy, human beings. It's a great work, saving the lives of helpless little ones.

An 83-year-old man a few days ago rode to the top of the Mills Building, El Paso, in the elevator, and then began a systematic canvass of the offices. He carried a box of lead pencils and around his neck he wore several dozen pairs of shoestrings. From the

top floor of the building he descended by the stairway to the floor below, canvassed it, and then slowly moved to the next floor, and the next and next, and so on. Several times in his descent he stopped and sat on the stairs to rest, but he "covered" the building, and when he reached the bottom he was "sold out." His day's labors netted \$10.76 in pennies, nickels, dimes, and quarters, which were turned in to swell the babies' fund. This man makes his living selling pencils and shoestrings, but for one whole day he worked for El Paso's undernourished babies.

Studying Home Problems.

Despite the criticism aimed at the girls of the present day, many of them are giving time to the study of household matters that their mothers and grandmothers never dreamed of in their teens.

For instance, members of the five Girl Reserve Corps in Grand Junction, Grand Valley project, devote one meeting each month to the study of matters relating to better homes. They learn essentials of interior decoration, balanced menus, budgets, and other foundations on which a home may be buildied to be of the greatest possible future benefit to the families of the young women. And since the other parts of the program of the Girl Reserves deal with health of the body and an appreciation and love for nature and the great outdoors, the modern girl may be said to be far in advance of the girl of even a generation ago, who knew, to be sure, something about cooking and sweeping, but little of the underlying principles that make for economic leadership in the home.

A Good Record.

An imposing record of accomplishment and service is included in the report of the Home Economics Club of Yakima for the past year. Their activities ranged from the publication of 2,000 cookbooks to a substantial contribution to the school milk fund, through which milk is given school children who need the nourishing drink but whose parents are unable to pay for it.

During the year the club held 12 meetings with an average attendance of 51. The year was begun with 62 members, but closed with 75 members and 6 on the waiting list.

Their first enterprise was a rummage sale, a part of the proceeds going to the milk fund. Next they purchased and sold 20 lecture course tickets, thereby helping the milk fund \$40 more. This spring they held a food sale and turned over the entire proceeds—\$123.49—to the same purpose.

They compiled and sold a large number of cookbooks. At Christmas time they entertained the old men at the county poor farm with a program and gifts. Their entertainments also included representatives from all the district clubs, one for their hus-

bands, the other federated clubs, and a Swedish day. The club took a stand against trained animal and carnival acts; they are cooperating for a better water system; helped with the cooking classes in the Y. W. C. A., and served refreshments to the Klever Klub girls of the Y during April. They cooperated with the Woman's League of Community Service to better dance halls, helped bring an art exhibit to Yakima, paid in \$25 to the community chest, and donated \$50 to the Near East Relief and oriental colleges for women.

Twenty-five cents per capita were paid by the club to the State federation for the educational loan fund. They also paid \$25 toward kitchen utensils for the Y. W. C. A. and \$25 toward the cemetery-improvement fund.

A Town Goes Fishing.

The little Mormon town of Greer, out in the Arizona mountains, has learned to make the most of what it has. When the trout season opens Greer issues a general invitation to everybody to come and fish in the sparkling streams near by.

This year 300 people made their way to Greer and shared the delights of trout fishing under ideal conditions. Before they left Greer showed them everything there was to see in the town and the orchards and fields roundabout.

Perhaps Greer is fishing, too, using trout for bait. It pays to advertise. The little town is doing all a big city can do—capitalizing its resources and making itself attractive to homeseekers. Prosperity and happiness to all such towns.

Rest Rooms.

The free rest room which is maintained by club women of Grand Junction, Grand Valley project, Colorado, has established a magazine bureau. They asked the people of the community to cooperate by donating current numbers after they had been read by the family. Realizing that thousands of magazines read each month in the city were afterwards burned or junked and that many people eager for such reading matter could not afford to purchase at news-stand prices, they conceived the idea of making this valuable material available.

It is very hard and often impossible to get last month's number of a magazine at a news stand, and yet there is often a call for them, and the rest room will endeavor to supply this demand at a flat charge of 5 cents each.

Nampa, one of the live wires of the Boise (Idaho) project, proposes to establish a municipal rest room for the accommodation of women from the country who come to town to trade. It is estimated that suitable equipment can be installed for \$1,500, the city to defray half the cost.

A delightful rest room! If you don't believe it you are invited to drop in the temple of agriculture, Las Cruces, N. Mex., and inspect and enjoy the quarters which have been fitted up for the farm women. A large hall on the second floor of the building has been turned over to the women for their exclusive use. An outside stairway has been erected for the convenience and privacy of the women, who otherwise would be obliged to pass through the offices of the men on the first floor. Several small rooms adjoining the large hall have been fitted up for the benefit of mothers of small children; the library table is covered with current literature; a piano, loaned by the Maccabees, fills an attractive corner, and a kitchenette with its accessories, and a lunch room opening off from it will prove of interest and value to the visitors who are in town for the day.

The various farm women's clubs are cooperating to such an extent that they excited the interest of the men of the Farm Bureau, who voted \$50 for furnishing the kitchenette, and who volunteered to do over the wood floors to prolong their life and usefulness, and at the same time save the cost of the work.

Many years ago, back in a little town in Wisconsin, a clever bank official nearly put many other banking concerns in the county out of existence, while his own institution waxed strong and prosperous, all as the result of establishing a rest room back of the main bank room. This was at that time an unheard of innovation, and spurred on by the success of his venture he branched into many other experiments which made his bank headquarters for farmers' families for miles around.

Preserving Business Grows Out of Club Work.

An interesting story has just been given out by the Department of Agriculture concerning a successful business venture which easily might have occurred on any of the reclamation projects.

When home demonstration work was first started in South Carolina, some 10 years ago, a Mrs. Townsend became keenly interested in preserving and pickling, and made rapid progress. For two years she canned abundantly of local fruits for home use, but in her third year she began to market in a small way such products as Dixie Relish, pineapple pears, grapefruit preserves, mixed pickles, watermelon-rind pickles, peach and plum preserves, jams, jellies, etc. Five years ago her output was not over 1,000 containers.

About this time a new home demonstration agent came to the county and assisted Mrs. Townsend to enlarge her market. In 1920 she added a small canning kitchen to her home and began to employ her niece and sister to help. She increased her containers to 4,000. In 1921 she built a factory and filled

over 12,000 containers, necessitating the employment of 6 to 10 of her neighbors daily. In 1922 her output was greater, but she invested the entire proceeds in a factory twice the size of the first with proper commercial equipment. The establishment is a great benefit to the community, as it furnishes employment to many who otherwise have only a few sources of income.

Club Insignia.

A new idea in club insignia has been developed by girls in Brown County, Tex., to enable other club members, their friends, and neighbors to identify them with the important work they are doing under the extension system of the Department of Agriculture. As they have chosen cannas for their club flower, each girl was given one plant to set out at the right-hand side of her front door. Those who have more canna plants place them on both sides. Club girls all over the country can locate each other easily in this way, and an indirect benefit of this simple but distinctive mark has been that the girls take a great deal more pride in their homes and yards.

Game Birds on the Shoshone Project.

Passersby were recently greatly attracted by the appearance in the front window of a Powell business house of a bantam hen with six baby pheasants. The chicks had just been hatched and were cute and dainty, running about the inclosure arranged for them in the window. These ring-neck pheasants were hatched from eggs laid by older birds on the Thompson place and later put under a hen to be hatched. Mr. Thompson is ambitious to see the Powell flat the home of many pheasants, and it is said that other residents of the project have joined in the enterprise. State game wardens almost everywhere are prepared to furnish information.

Home Gardens.

The Civic League of Williston, North Dakota pumping project, is making an earnest effort to promote the home-garden movement, which was given such a great impetus during the war. The planting of trees, bushes, and gardens form part of a general program for the year, which is being promulgated by the league and has the cooperation of other social organizations of the project.

In speaking of the planting of gardens, one of the members of the Civic League said: "Plant trees and shrubs, beautify your lawns and back yards. You will get a great deal of pleasure out of it by watching the trees and plants grow. A good vegetable garden will lessen the living expense and will also keep down the weeds that grow on vacant and back lots when gardens are not planted. Let us all cooperate in making our city beautiful."

City Drinking Fountain.

Through the activities of the Woman's Civic League and the cooperation of the city council of Newell, Belle Fourche project, S. Dak., a public drinking fountain will soon be installed at one of the principal business corners of the city. The ladies are financing the purchase of the apparatus, and the council will pay the cost of installation. The fountain has been ordered, and upon its arrival will at once be placed in service.

Early Strawberries.

Mrs. Glenn Walton, of Rupert, Minidoka project, Idaho, claims the honor of ripening the first strawberries on the project, having had a family shortcake on May 27. The Walton garden comprises two full lots, or about 2,000 plants, and they marketed a minimum of 20 gallons every other day during the season. The early berries brought 20 cents a box.

Scientifically Directed Recreation.

Grand Junction, Colo., recently enrolled a class of volunteer workers for instruction in directing the activities of the public parks and playgrounds. Those who enrolled in the three weeks' course are expected to attend all meetings and give a certain period of time in service in the parks. Doctor Dixon, who directs these institutes, states that in all successful games and exercises rhythm must play an important part. Stirring marches and waltzes in three-four time are used to develop the feeling of rhythm, and even the simplest march or most old-fashioned game takes on a new interest when it is done with just the right step, whether martial tread or graceful skip. Quieter games are introduced for breathing spaces, which youngsters are not usually wise enough to plan for themselves. Fun and friendliness and cooperation are instilled by the games planned.

There is no magazine which does not devote a part of each issue to developments in community recreation work, and most of them quote the organization represented by Doctor Dixon and Mr. Bradford as a recognized authority.

Grand Junction believes this will prove to be the most wholesome community activity ever organized in western Colorado.

Five-Year-Old Champion

The championship for a clip of wool for Minidoka County is claimed by Dale Stillwell, 5 years old, residing near Paul. Dale claims the championship for his entire herd, which consists of one 2-year-old "Peggy," presented to her owner as a no-account lamb two years ago and raised on a bottle. When Peggy was 1 year old she was shorn of her first fleece, which

weighed 19 pounds. At the age of 2, last May, she was relieved of her second clip, weighing 25 pounds. At the present price of wool this would mean nearly \$18 Peggy brought her owner in two years, and this is the record upon which he claims the championship, although he says Peggy possesses many other praiseworthy traits.

Bye Baby Bunting.

Strange how great poetry belongs to any and every age. And that the Mother Goose rhymes are as great poetry in their way as the Shakespearian classics is evidenced by their continued popularity. The little Baby Bunting rhyme is as true to-day as it was in England's early days when the peasant hunted rabbits on the moors of Yorkshire and Westmoreland. Only the twentieth century rabbit fancier hunts them in his own back yard and his wife makes the skins into the warmest little coats and muffs and collars, and when the babies are all fitted out she sews a whole lot of the soft skins together and makes a real fur coat for herself.

There are rabbit-skin coats on the market now which only an expert can tell from seal, and many beautiful white fur coats sold for "real coney" are simply rabbit skin, but just as beautiful for all that.

Most farm women eagerly welcome suggestions as to methods of earning pin money in connection with their regular duties, and Mrs. W. B. Elliott, president of the Coney Fur Club, of Los Angeles, is quoted as authority for the statement that fur-bearing rabbits are easily raised and that she has found it a lucrative business as well. In one year Mrs. Elliott cleared \$500 from the sale of animals and furs and some fur garments which she made herself.

Most women who learn to tan fur and make it into garments begin simply to furnish stoles and neck pieces for their own families. This done, they stop, because killing the beautiful animals is a disagreeable task; but if they do good work and keep on, the business is usually good and profitable.

All rabbits are fur bearing, but some are much better than others, and those which are generally bred for this purpose are the White Himalayan, American Blue, Checkered Giant, Brown Havana, Black Flemish Giant, and the French Silver. The rabbit meat furnishes a delightful addition to the family menus, and may be canned as well as chicken and other meats. If raised for the sale of furs one should keep 100 or more animals. The meat can usually be marketed when the animals are killed for their skins. Rabbits used for fur should be in their prime; that is, from four to five months of age. Fryers of from six to eight weeks can be used for children's garments. Skins of rabbits past their prime are stiff and hard to handle. If skins of full-grown rabbits are tanned it should be fall or early

winter, when they are not shedding. Young rabbits can be used any time.

TANNING RABBIT SKINS.

Remove the fat as soon as the skin is off the rabbit, stretch well, and dry in the shade. Do not try to do anything with it until it is thoroughly dry. While the skin is fresh from the rabbit tack it on a board and sprinkle salt and alum over it on the raw side, using a tablespoonful of alum to a cup of salt. The skins may lie thus for any length of time before they are tanned, so long as they are dry.

When ready to tan wash well with soap and water, using some washing powder to soften the pelt. When thoroughly clean put in a tanning solution consisting of a gallon of water, a quart of salt, and an ounce of sulphuric acid, commercial strength.

The tanning solution should be kept in a wood or stone vessel and the pelt may remain in it from 3 to 21 days, according to age. Three days is time for a fryer's pelt. By stretching it over the finger one can easily see whether the skin is white and the grease entirely gone.

Now wash again, dry slowly in the shade, and pull and stretch the skin until it is soft, working it at intervals while still damp.

For making garments a good pattern is necessary, since each skin should be cut in a rectangular piece to avoid all possible waste. A neat worker can put these pieces together so that the garment will look as if it were all one piece of fur.—L. L.

Cows Furnish Fine Income.

H. W. Jeans, who lives 3 miles from Rupert, Minidoka project, Idaho, is an enthusiastic booster for the cheese factory, and no wonder. "I think the cheese factory is one of the best things ever established in this county for the farmer," he said recently. Mr. Jeans milks six cows, Jersey and Holstein, but he prefers Holsteins for the dairy business, as he has one four-year-old cow of this breed that gives 65 pounds of milk daily and tests 4.4. All his cows are good, however, as is shown by the fact that the six bring in a check of a little over \$90 per month. "It brings money when the farmer needs it most, and pays expenses at all times," he asserts.

The Rupert cheese factory in a recent report stated that during the four months since it opened it had paid out to the farmers for milk in excess of \$13,000. Semimonthly shipments are made to the new Kraft factory in San Francisco. This plant was built because of the fact that the western local dealers are doing so well it was necessary to take care of the western market. As soon as machinery can be obtained factories will be opened at Declo and Burley, and several other towns are under consideration.

ECONOMIES IN CANAL CLEANING, BOISE PROJECT, IDAHO.

By C. L. Tucker, Assistant Engineer, Bureau of Reclamation.

IN conformity with the department's policy of economy, a special endeavor has been made to lower operation and maintenance costs on the Boise project. As the principal item of maintenance cost is removal of silt the supervision of this work has been reorganized with a view of obtaining the maximum efficiency from labor.

The system used in directing the cleaning work on this project may not be adaptable to all irrigation projects. For this reason the following description of the Boise project organization and the distribution system is given. The project is divided into four water master's divisions of approximately 36,000 acres each. The water masters have direct charge of all operation and maintenance forces within their territory and act as superintendents on maintenance work. The cleaning foremen are selected from among the ditch riders. It is possible to drive with an automobile along or on the banks of all canals and along practically all of the laterals. The structure numbers represent the distance the structure is from the head of the canal or lateral. These conditions allow inspection to be made rapidly and without difficulty. On large canals it is possible to inspect from 20 to 25 miles in one day.

The description of organization of forces and the supervision of work is for convenience divided into the following headings: Inspection, Records, Silt removal, and Results.

Inspection.—The water master, in company with the writer, inspected the canals and laterals of his division. Notations were made directly on a chart as to what should and should not be cleaned. If the work was exceptionally heavy, an "H" was shown in the record of the portion to be cleaned. If exceptionally light, an "L" was shown. The chart is explained later under the heading "Records." When inspecting canals considerable benefit is derived other than that relating to the cleaning. On this project, in order that pressure might be maintained on headgates, it has been necessary to install checks in canals of shallow depths. These checks naturally decrease the velocity, resulting in heavy silt deposit and moss growth. It is the tendency of most cleaning foremen and even some water masters to gouge the bottom and sides of canals of this character, especially if they have knowledge of any trouble during the previous water season. This kind of cleaning is expensive and increases the trouble rather than overcoming it. If the canals are widened, the velocity is naturally decreased with a given quantity of water.

When conditions of this kind are found, the bottom of the canals is allowed to narrow and all silt is being put on the banks. Eventually the water depth and velocity will be increased until little checking is required. This will eliminate to a great extent moss growth and silt deposit. The water master and irrigation manager also become familiar with the system and secure first-hand information as to the condition of structures and weak places in the canal banks. At the time of cleaning, such banks can be strengthened or riprapped which will probably prevent a break the following season. The water master is more capable of judging what requires cleaning than the cleaning foreman. If the water master is in any doubt as to the grade of certain sections, grade stakes are furnished by the engineers. It is undoubtedly a fact that without such supervision thousands of dollars would be expended each year for cleaning canals the bottoms of which were already below the original grade.

FORM NO. 5.—Canal cleaning costs, detailed estimate after inspection, division "Sample."

Canal or lateral.	Class A canals.			Class B laterals.		
	Total stations. ¹	Stations inspected.	Stations to clean.	Total stations.	Stations inspected.	Stations to clean.
Waldvogel.....	668	668	275	362	362	184
North Power.....				220		
Siphon.....				50	50	20
South Power.....				214	214	62
Dirkman.....				41	41	12
Butte.....				114	114	47
Flume.....				132	132	59
North McElroy.....				79	79	0
Sol.....				20	20	11
Hyer.....				24	24	5
South McElroy.....				53	53	18
Delta.....				29	29	0
Torrence.....				18	18	0
Demke.....				136		
Total (89 other items omitted)	2,515	1,543	275	8,355	2,798	739

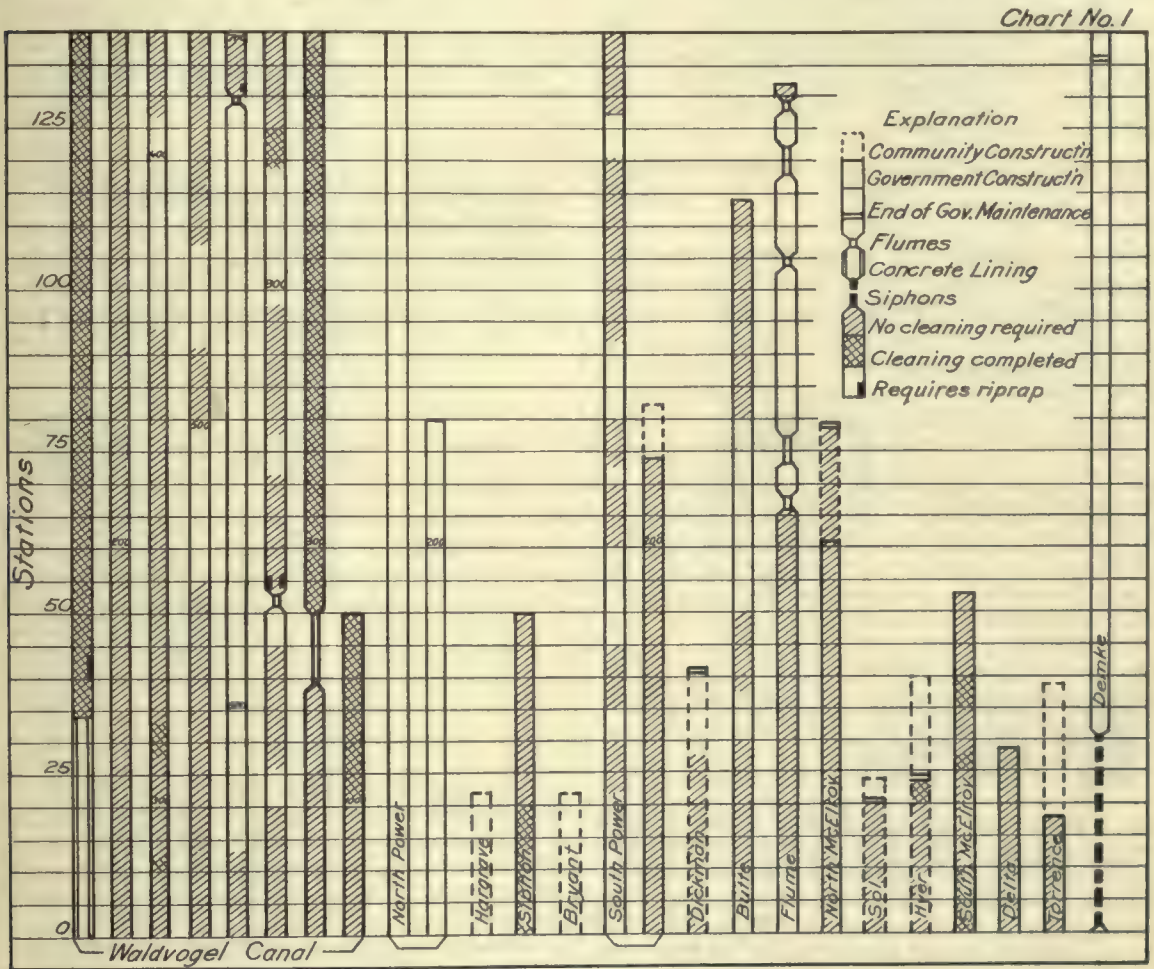
¹ Stations each 100 feet in length.

Records.—As a foundation for cleaning records a chart was prepared on which all canals and laterals in each water-master's division are shown. A miniature chart (Chart No. 1) is shown in the accompanying illustration. The original chart is plotted to a scale sufficiently large to show each station. A copy is kept in each water-master's office as a reference, showing the status of canals and laterals, such as end of Government construction, Government opera-

tion, or Government maintenance. At the time of inspection any portions of the ditch not requiring cleaning are blocked in solid with a colored pencil. The remaining portions are left blank and filled in, as shown on the chart illustrated, as the cleaning progresses. At the end of the season's work these charts can be filed for future reference. Form No. 5 is used for assembling the estimated cleaning. The canals and laterals are divided into two classes and each class is estimated separately. Before adopting the present system it was nearly impossible to estimate cleaning costs with any accuracy. During the past season in one water-master's division and after 4,341 stations out of 10,870 stations had been inspected it was estimated that it would be necessary to clean 2,540 stations at a cost of \$4,205.08. When cold weather caused a suspension of the work, which was practically completed, 2,301 stations had been cleaned

at a cost of \$3,858.31, or within 1.1 per cent of the estimate.

As the work progresses each foreman's results are segregated in the water master's office and submitted weekly to the writer. If any foreman's costs greatly exceed the estimate his work is immediately investigated. Sometimes it is found that the work is heavier than estimated or that the foreman is using slips where he should use fresnos, or the reverse. Usually, though, it is found that the foreman is using more teams than is economical. Each water master has from 10 to 15 cleaning crews working simultaneously, and it is well to know immediately if any are exceeding the estimate. The results reported weekly by each water master are summarized in the office and the totals are shown on Form No. 4, which shows the progress as well as comparative costs. At the completion of the cleaning season Form No. 3 is prepared,



Condition of canals and status of cleaning operations, Boise project, Idaho.

FORM NO. 4.—*Canal cleaning costs, estimate and progress, division C.*

ESTIMATE.

Total stations in division.....	10,870
Inspected to date.....	4,341
Inspected stations that require cleaning.....	1,014
Estimated total to clean $\frac{1,014}{4,341} \times 10,870$	2,540
2,540 at \$1.53.....	\$3,886.20
Weir pools.....	\$318.88
Total.....	\$4,205.08

PROGRESS.

Date.	Stations.	Cost.		Per cent complete.		Weir pools.	
		Total.	Unit.	Cost.	Stations.	No.	Cost.
To Oct. 31, 1922....	97	\$161.16	\$1.66	4.1	3.8	....	\$258.63
Nov. 1 to 10, 1922..	947	1,342.00	1.42	34.6	37.3	....	23.50
Total.....	1,044	1,503.16	1.44	38.7	41.1	....	282.13
Nov. 11 to 20, 1922.	896	1,474.72	1.74	38.0	33.3	....	29.25
Total.....	1,890	2,977.88	1.57	76.7	74.4	....	311.38
Nov. 21 to 30, 1922.	411	561.55	1.37	14.5	16.2	....	7.50
Total.....	2,301	3,539.43	1.54	91.2	90.6	....	318.88

FORM NO. 3.—*Canal cleaning costs, division C summary, 1922.*

Foreman.	Class A canals.			Class B laterals.			Weir pools.	
	Station.	Cost.	Unit cost.	Station.	Cost.	Unit cost.	No.	Cost.
1.....	101	\$392.09	\$3.88	....	....	....	....	....
2.....	4	29.67	7.42	....	....	....	....	....
3.....	....	....	....	53	\$53.42	1.01	....	....
4.....	....	....	....	251	317.83	1.27	34	\$25.34
5.....	....	....	....	269	343.00	1.27	20	15.00
6.....	....	....	....	274	351.33	1.28	24	28.67
7.....	....	....	....	290	379.22	1.31	16	11.50
8.....	....	....	....	230	304.63	1.32	11	8.25
9.....	....	....	....	98	143.00	1.46	....	....
10.....	....	....	....	216	321.44	1.49	....	....
11.....	....	....	....	500	873.80	1.75	228	160.26
12.....	....	....	....	15	30.00	2.00	16	12.00
13.....	....	....	....	....	....	....	16	57.86
Total..	105	421.76	4.02	2,196	3,117.67	1.42	436	318.88

SUMMARY.

Class A canals: 1.99 miles; cost, \$211.94 per mile.
 Class B laterals: 41.60 miles; cost, \$74.94 per mile.
 Estimated stations to clean: 2,540.
 Cleaned: 2,301, or 90.6 per cent.
 Estimated field cost: \$4,205.08.
 Actual cost to date: \$3,858.31, or 91.7 per cent.

which summarizes the total stations cleaned and the cost by foremen. The foremen are grouped under their respective water masters and are arranged according to the unit cost of their work. The totals shown on Form No. 3 are carried to Form No. 1, and are arranged according to unit costs. On this form the water master cleaning at the lowest cost is given a standing of 100 per cent. The others are rated,

using the cost which is given 100 per cent as a basis. This form also compares the actual cost with the estimated cost for the entire project. Form No. 2 shows the standing in percentage of each foreman, taking the project as a whole. For determining the basis of percentages an average cost was taken from one-half of the total stations cleaned at the lowest costs.

FORM NO. 1.—*Canal cleaning costs, total summary, 1922.*

Division.	Per cent efficiency.	Class A canals.		Class B laterals.			Weir pools.	
		Station.	Unit cost.	Station.	Cost.	Unit cost.	Number.	Cost.
A.....	100	440	\$1,283.34	\$2.92	....	....	....	....
B.....	77	45	170.29	3.79	....	....	....	....
C.....	73	105	421.76	4.02	....	....	....	....
A.....	100	....	....	2,196	\$3,117.67	\$1.42	436	\$318.88
B.....	77	....	....	922	1,397.59	1.52	192	146.00
B.....	63	....	....	624	1,408.90	2.26	62	46.97
Total.....	590	1,875.39	3.18	3,742	5,924.16	1.58	690	511.85

SUMMARY.

Class A canals: 11.18 miles; cost, \$167.75 per mile.
 Class B laterals: 70.88 miles; cost, \$83.58 per mile.
 Estimated stations to clean: 6,270.
 Actually cleaned to date: 4,332; per cent completed, 69.2.
 Estimated field cost: \$12,358.18.
 Actual cost to date: \$7,799.55; per cent of estimate, 63.1.

FORM NO. 2.—*Canal cleaning costs, relative efficiency of foremen, 1922.*

CLASS A CANALS.

Foreman.	Division.	Station.	Cost.	Unit cost.	Efficiency, per cent.
1.....	A	105	\$236.00	\$2.25	124
2.....	A	66	150.08	2.27	123
3.....	B	27	61.83	2.29	122
4.....	A	8	21.00	2.63	106
5.....	A	88	264.50	3.01	92
6.....	A	149	484.06	3.25	86
7.....	C	101	\$92.09	3.88	72
Total ¹.....	....	590	1,875.39	3.18	....

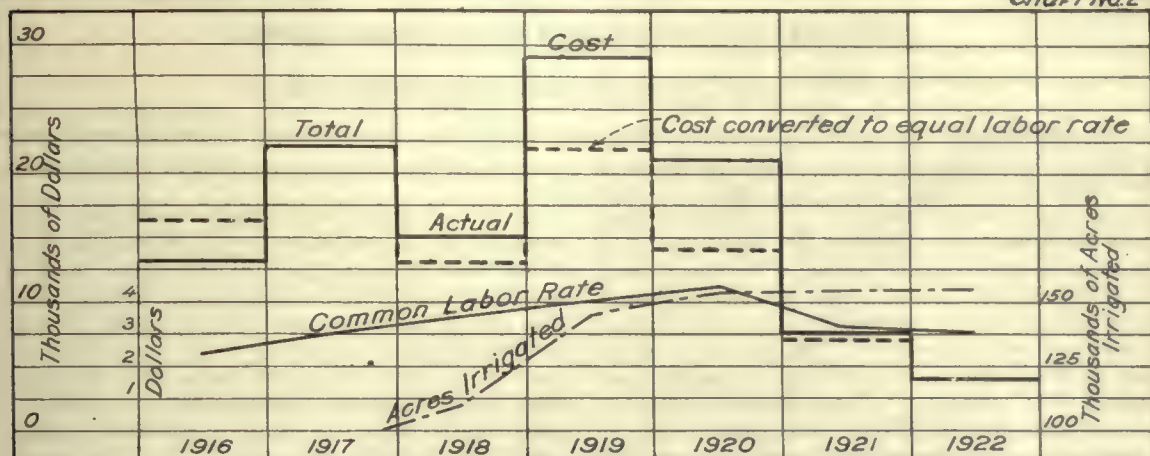
CLASS B LATERALS.

Foreman.	Division.	Station.	Cost.	Unit cost.	Efficiency, per cent.
1.....	C	53	\$53.42	\$1.01	132
2.....	A	115	117.25	1.02	130
3.....	A	50	103.14	1.15	116
4.....	C	251	317.83	1.27	105
5.....	C	269	343.00	1.27	105
6.....	C	274	351.33	1.28	104
7.....	C	290	379.22	1.31	102
8.....	C	230	304.63	1.32	101
9.....	B	43	61.17	1.42	94
10.....	A	183	261.18	1.43	93
Total ².....	....	3,742	5,924.16	1.58	....

¹ 5 other items omitted for lack of space.

² 16 other items omitted for lack of space.

Chart No. 2



20918

Cost, by years, of removing silt from canals and laterals of one division, Boise project, Idaho.

Silt removal.—From Chart No. 1, or Form No. 5, the water master groups the cleaning work in a certain locality and furnishes the foreman with a work order which shows exactly the portion of each canal he is to clean. The water master knows from the classification about how many teams the foreman can use economically. It has been found by comparison that not more than from three to five teams can be used to advantage on small laterals. The foreman on this size crew takes the place of one single hand. Where larger crews are used it often becomes necessary to move several times during the day. The time taken for moving is absolutely a loss. With smaller crews less moves will be made per thousand feet of lateral cleaned. Long moves can be arranged to occur at the end of the day's work. As cleaning crews are required to go to and from work on their own time, this eliminates a move during working hours. A large saving can be made by inspecting the ditches before the commencement of cleaning operations. Under the present system the foreman is credited with only the actual stations cleaned and not the distance traveled. If the cleaning is very light and scattered, smaller crews are used. No trouble is experienced on this project in securing teams from water users, and as it is the policy to apportion the work among as many farmers as possible, those living nearest the work are employed.

Results.—The present method of supervising cleaning work was put into effect during the fall of 1921. The accompanying table shows a comparison of costs between the work done in the fall of 1921 and 1922.

The wage scale during the falls of 1921 and 1922 was the same. The 1922 results show a saving over 1921 of 32 per cent on the canals and 30 per cent on the laterals. The work was better organized in 1922 and the water masters and foremen, realizing that

Unit cleaning costs, by teams.

Year.	Class A canals.		Class B laterals.	
	Miles.	Unit cost.	Miles.	Unit cost.
1921 (fall).....	5.84	\$247.00	70.33	\$120.00
1922 (fall).....	11.18	167.75	70.88	83.58

their efficiency was to be rated, desired to at least make a good showing. For a matter of further comparison a chart (chart No. 2) has been prepared and is also illustrated. This chart shows the total cost by years of removing silt from the canals and laterals of one division. The present method of supervision was put partly into effect in this division in 1920 and fully into effect during the years 1921 and 1922.

Cherries Make Money for Yakima Farmers.

From the Yakima Valley, Wash., 201 cars of cherries have already been shipped, averaging 20,500 pounds each. The average price received by the growers is 9 cents per pound, making the total value of the 201 cars about \$375,000. In addition, the Libby, McNeil & Libby cannery at Yakima handled about 1,000 tons of Royal Ann and sour cherries. Figuring the cannery tonnage at an average price of 7½ cents per pound, \$150,000 would be added to the returns, making the total gross returns for the 1923 cherry crop of the Yakima Valley \$525,000.

The crop was one of the best ever grown in the valley, there was less trouble with shipping than in former years, and all growers made money at the prevailing prices.

Growers received from 10 to 15 cents per pound for the Bing cherries and 7 to 9 cents for Royal Ann and other varieties.

SNOW SURVEYS, OKANOGAN PROJECT, WASHINGTON.

By Calvin Casteel, Project Manager, Bureau of Reclamation.

FOR the past six years, not including the season of 1921, the Okanogan project has suffered to some extent from a water shortage. It has always been hard to foresee what amount of water would be available until the middle or last of June each year. After this time to plan and carry out any emergency measures to secure additional water has entailed much rush work and worry. The amount of water that should be delivered to the lands during May and June is also dependent on the amount that would be available for the season. The snowfall on the lower levels or in the mountains does not always indicate the amount of water that may be available.

It occurred to this office and the board of directors of the water users' association that a snow survey each spring made at or near the same time and visiting the same territory each time would be of value in estimating the amount of water that would be available each year, a month to six weeks in advance of the peak of the run-off from the melting snows. Accordingly, Director John S. Petersen, the gate tender at Conconully Dam, C. M. Conger, and the project manager made a trip into the mountains near the last of May, 1922, driving in an automobile up to an elevation of about 3,500 feet and then climbing on foot to a further elevation of 5,000 feet. To do this we were forced to wade through some snow, and this was as we wished, so that we could find out its depth at this elevation and the area covered. At the 5,000-foot elevation we were on a spur or ridge which gave us a good view of the greater part of the watershed of the West Fork of Salmon Creek. From these observations we estimated that pumping about 4,000 acre-feet from below the gate sill in Salmon Lake we could deliver to the subscribed water-right lands 2 acre-feet for the season, and have the amount necessary for all vested rights. Our estimate was very close, as we actually delivered the estimated amount by pumping about 2,700 acre-feet from Salmon Lake.

This season the same party again made a trip into the same territory on May 4, another member of the board of directors accompanying us. From this trip and another made into the same territory two weeks later by the gate tender we estimated that the delivery of water to subscribed-right lands would be 1.5 acre-feet per acre for the season, with emergency pumping from Salmon Lake amounting to about 3,000 acre-feet. Up to June 1 the run-off seemed to bear out this estimate. Rains, however, which started May 25 and continued intermittently until June 15 stopped irrigation and added very materially to the water

supply, and we will now have at least 2 acre-feet per acre.

In 1922 we found 3 to 3½ feet of snow over a considerable area on the north slopes, whereas the south slopes were almost completely bare, except those up to an elevation of 6,000 feet or more. In 1923 on the first trip, which was made three weeks earlier than in 1922, owing to an earlier season, we found less snow in depth by at least 6 inches and covering a much smaller area. On the second visit this year we found that about 1 foot in depth of snow had disappeared and the area was much smaller. The run-off between these visits to the mountains was very small.

We believe that it will be a good plan to carry out this snow survey each year and visit the same territory each time, and that by so doing and keeping a record of what snow we find we will soon be able to estimate closely a month or more in advance of the peak of the run-off the amount of water we will have to deliver for that season. This will be of material aid on the Okanogan project in determining the rate at which we can deliver water and what, if any, emergency pumping is necessary to supplement the supply. Early information also aids the water user in determining how best to handle his crop and his irrigation.

"I'm Satisfied," Says Minidoka Farmer.

Landing in Rupert, Idaho, from Nebraska nine years ago with \$250 in capital and a family of four, now owner of a 40-acre farm near the Minidoka Dam, well cultivated, stocked with 15 head of good dairy cows and heifers, 4 good hogs, and a bunch of chickens, and not a dollar against the place or equipment, S. C. Aker says his place is not for sale at any price.

Mr. Aker's cows now bring in an income of \$140 per month, which he expects to increase to \$200 in a short time. "I'm getting my place in good shape, and I'm satisfied," he says.

A South Dakota farmer sold three good-grade steers on the Omaha market for \$55.36 apiece more per head than scrubs raised with them.

A dairyman kept milk records of some common cows and pure breds with the result that showed a production at the end of the year double that of the common stock.

RECLAMATION LAW NOTES.

By Ottamar Hamel, Chief Counsel, Bureau of Reclamation.

Obstruction of Passage Over Public Lands.

IN August, 1919, the owners of a band of sheep then about 30 miles northwest of Mackay, Idaho, committed to three employees the task of driving the sheep to a range on the other side of Mackay. A part of the route lay over unoccupied public lands of the United States in relative proximity to a stream called Lost River. In that vicinity there were two well-known trails. One, recently established, passed on the east side of the river and the other, theretofore used by the owners of the sheep, passed on the west side. The employees took the latter trail, and while following it in the usual way of driving sheep were met by some cattlemen who insisted that the lands thereabouts were used as a cattle range and demanded that the sheep be not driven along that trail but taken to the trail on the other side of the river, 4 or 5 miles away. This occurred about 11 o'clock in the forenoon of August 25, when it was very warm. One of the employees answered that the sheep should be permitted to rest until it became cooler, and that they could not be taken across the river without an order from one of the owners. Such of the cattlemen as were present then pointed out a place where the sheep could be held in the shade and went away. About 4 o'clock in the afternoon some of the cattlemen returned and demanded that the sheep be moved to the other side of the river right away. To this the answer was made that instructions had been received—presumably by telephone—from one of the owners to await his coming, which would be later in the day.

One of the cattlemen then requested his comrades to line up with their rifles, which they did, whereupon he proceeded to make a hostile demonstration against one of the employees and to chase him about, obviously as a matter of intimidation. The cattlemen then went away. That evening one of the sheep owners arrived and directed that the driving be continued along the trail on which the employees were proceeding—it being “the trail we always used” and “about 3 miles wide.” Early the next morning, before the employees started the sheep again, one of the cattlemen returned and inquired what was going to be done and, on learning what the owner had directed, said: “You can't go through there. Something will happen to you this morning. Are you willing to take the consequences?” This cattleman then rode away and a little later others of them rode up on a gallop, ordered the employees to put up their hands, which was done, and then began shooting.

They shot and seriously injured one of the employees, threatened to finish him, and did other things calculated to put all three in terror. The cattlemen then moved two of the employees and the sheep to the other side of the river and took the wounded employee to a hospital. While some of the cattlemen were present at one time and some at another, the circumstances were such that what was done was the act of all. The lands through which this trail extended and over which the employees intended to drive the sheep were unoccupied public lands of the United States. The purpose of the cattlemen in all that they did was to prevent the employees from proceeding with the sheep over those lands. The lands were comprised in two townships, each 6 miles square, and within these townships were several small tracts—a minor part of the whole—which were claimed and held by individuals under the public land laws; but the trail did not pass over these small tracts nor were the employees driving or intending to drive the sheep over them.

Five of the cattlemen were indicted, tried, and convicted in the district court of the United States for the district of Idaho upon a charge of unlawfully preventing and obstructing, by means of force, threats, and intimidation, free passage over and through unoccupied public lands of the United States, contrary to the provisions of sections 3 and 4 of the act of February 25, 1885 (23 Stat. 321). The circuit court of appeals affirmed the judgment (273 Fed. 410). The case was brought to the United States Supreme Court upon a writ of certiorari and the judgment of conviction was again affirmed. (*McKelvey et al. v. United States*, 260 U. S. 353.)

In commenting upon the right of Congress to prescribe rules respecting the use of public lands, the court cited *Camfield v. United States*, 167 U. S. 518, 525; *United States v. Grimaud*, 220 U. S. 506, 521; *Light v. United States*, 220 U. S. 523, 536; *Utah Power & Light Co. v. United States*, 243 U. S. 389, 404-405.

Relative to the rights of the States to prescribe police regulations applicable to public land areas, the court referred to two Idaho cases—*Bacon v. Walker*, 204 U. S. 311, and *Omaechevarria v. Idaho*, 246 U. S. 343.

Possession of Unsurveyed Public Lands.

The act of March 28, 1908 (35 Stat. 52), restricts the right to enter desert land to surveyed land, but

contains a proviso that any qualified individual "who has, prior to survey, taken possession of a tract of unsurveyed desert land," and "has reclaimed or has in good faith commenced the work of reclaiming the same," shall have the preference right to make entry within 90 days after the filing of the approved plat of survey in the district land office. What will constitute possession of a tract of land under this act depends largely upon its character and condition and the use to which it is adapted. Inclosure or physical occupancy of every part is not necessary. Plowing of a furrow around 320 acres, posting of a notice of claim, leveling, clearing, seeding, irrigating, and fencing of parts, with some ditch construction and marking of a boundary with stakes, is a taking of possession of the entire tract and commencement of the work of reclaiming it, within the intent of said act, as against an adverse claimant who occupied part of the tract subsequently, with notice. (*Cox v. Hart*, 260 U. S. 427.)

Taking of Property by the Government.

The United States has established a fort on Garish Island, lying east of the entrance to Portsmouth Harbor, R. I. For the purpose of practice and otherwise, projectiles are fired from this fort above lands belonging to the Portsmouth Harbor Land & Hotel Co. The United States Supreme Court has held in *Portsmouth Harbor Land & Hotel Co. v. United States* (260 U. S. 367) that such action by the Government imposes a servitude on the land of the company, constituting an appropriation of the property for which compensation should be made and from which an implied contract to pay may be inferred. See also *Peabody v. United States* (231 U. S. 530) and *Portsmouth Harbor Land & Hotel Co. v. United States* (250 U. S. 1).

Erroneous Irrigation District Assessments in Washington.

An irrigation district can make assessments on landowners only on the basis of benefits, and therefore an assessment fixed on the basis of what the directors thought could be collected from the landowners, not on the basis of benefits, is void, especially where it was levied to pay for certain construction purposes for which the law does not authorize money to be raised by assessments. Since there is no provision in the irrigation district law for an exclusive remedy against void district assessments, landowners can maintain an action in equity to cancel such assessments, and the courts can restrain the enforcement of the assessment and remove the apparent lien created thereby. (*Laycock et al. v. Lake Chelan Reclamation District et al.* (Washington), 214 Pac. 1054.)

Drainage on Federal Irrigation Projects.

Under the national irrigation act of June 17, 1902 (32 Stat. 388), and the extension act of August 13, 1914 (38 Stat. 686), the Secretary of the Interior has authority to provide for drainage as part of an extensive irrigation project in order to prevent damage to property from the operation of the irrigation system, and his determination that the expense of necessary drainage for the prevention of future injuries is a proper operation and maintenance charge to be assessed against the users is controlling, the term "operating expense," when applied to an irrigation system, including all damages to persons or property that may result from operation. (*Nampa & Meridian Irr. Dist. v. Bond*, 288 Fed. 541. For opinion trial court see 283 Fed. 569.)

Irrigation District Operation and Maintenance Assessments.

Under Rem. Comp. Stat., sections 7433, 7434, 7454, relating to the construction, improvement, and maintenance of irrigation systems, the owner of irrigable land within an irrigation district must respond to the annual assessment for the operation and maintenance of the system where the water is made available for his use, even though he does not use it, and the land is unimproved. The value of the right conferred or added to use facilities for irrigation, and not the extent to which a property owner may take advantage of the right, determines whether a benefit has been received. (*Otis Orchards Co. v. Otis Orchards Irr. Dist. No. 1* (Wash.), 215 Pac. 23.)

Status of Water Flowing Through Reservoirs.

It is a matter of common knowledge that a vast amount of water applied to direct irrigation comes through reservoirs. The fact that water diverted for direct irrigation passes through reservoirs on its way to land on which it will be used does not make it storage water, and such method of use does not warrant a decree limiting claimant to water for storage and denying use for direct irrigation. (*Nepesta Ditch & Reservoir Co. v. Espinosa* (Colorado) 215 Pac. 141.)

Hire of Automobile From Wife by Government Employee.

An employee of the Indian Service is not entitled to reimbursement for payments made to his wife for the hire of an automobile used on official business, in the absence of a showing that the wife had a separate estate, that the automobile was purchased and maintained from the wife's own separate funds, and that the payments would in no way inure to the personal profit of the employee. (2 Compt. Gen. 724.)

COOPERATIVE MARKETING SUGGESTED FOR UNCOMPAHGRE PROJECT.

One Way to Lift Farm Mortgages, Says State Director of Markets.

AT a recent meeting of the board of directors of the Uncompahgre Valley Water Users' Association, Colorado, Mr. Joseph Passonneau, director of markets for the State of Colorado, made a very impressive address on the advantages to be secured from cooperative marketing. Mr. Passonneau's remarks are so pertinent to conditions on many of our irrigation projects that we are reprinting certain extracts as quoted in a recent issue of the Montrose Daily Press, as follows:

"Cooperative marketing will lift the mortgages on your farms. It will give you better homes, more conveniences for them, better schools, and better churches. It will raise the whole social and economic standard of the community, because it is going to bring more money into the farmers' pockets.

"In Denmark cooperative marketing is more extensive than in any other country. And in Denmark there are fewer mortgages and less land tenancy per capita than in any other country in the world.

"First you must have a definite minimum of products. Take apples, for instance. Say there are 3,000 to 4,000 cars of apples produced in Colorado. No association should attempt to run with less than 50 per cent of these signed up—1,500 to 2,000 cars in this case.

"The reason is that the organization must control enough of the product to make it a definite factor in the market.

"Second, you must have a long-term contract, preferably not less than five years. It must be absolutely air tight—and fortunately in Colorado we have a cooperative marketing act under which you can write those contracts and be sure they will stand in any court.

"Third, your association should handle like commodities that require the same sort of commercial experience to sell. For example, one handling wheat and peaches would be likely to fail with one or the other. But one handling peaches and apples and cantaloupes—which go to the same class of trade—would require the same business experience to sell one as the other.

"Fourth, you must have a real community of interest in the organization. No member can have any privilege or advantage that all do not have.

"Fifth, you have to have a real business administration. Cooperative marketing is big business, and it takes a real business brain to run it successfully.

"Last, and perhaps most important, is this: The association must do business with the highest type of commercial ethics."

Our Front Page Illustration.

Project Manager Lawson, of the Rio Grande project, New Mexico-Texas, has sent to us the photograph, a reproduction of which appears on the front page of this issue.

The photograph, which was made by the United States Army Air Service located at Fort Bliss, Tex., shows the location of the recently constructed Tornillo heading, near the town of Fabens, Tex. Other works of the bureau are easily discernible, such as the Fabens drain and the Rogers lateral and levee. The facility with which cultivated areas are shown in contrast with the nonirrigated area gives a decided advantage over ordinary methods in showing such areas on the project.

A detachment of the United States Army Air Service has recently completed a mosaic photographic map of the Rio Grande, between Fabens and Fort Quitman, Tex., a distance of 45 miles. This map will be of great value to the Bureau of Reclamation in its studies of lower-river conditions on the Rio Grande project.

The Dairy Industry Pays.

The Sunnyside unit of the Yakima project, Washington, claims to be one of the best diversified farming sections in the country and offers some facts concerning their dairy industry as proof.

The three creameries that operate in the city of Sunnyside are paying out every week over \$6,000, or in round figures about \$25,000 every month, to the farmers of the section for milk and cream.

The dairymen's association has started a movement to erect a building in Sunnyside next spring which will speed up operations and cut out the long hauling to Yakima of the major portion of the product.

During the salmon run in the Yakima River it was an interesting sight to see 35 and 40 pound salmon jump the Sunnyside Dam in their journey upstream.

A hog grower states that his pure-bred swine make 50 per cent better growth than scrubs on the same feed and care.

ADMINISTRATIVE AND STATISTICAL PROGRESS REPORTS FOR JUNE, 1923.

Monthly Conditions of Principal Bureau of Reclamation Reservoirs for June, 1923.

[Elevation above sea level.]

State and project.	Reservoir.	Available capacity in acre-feet.	Elevation.		Storage in acre-feet.			Out-flow in acre-feet.	Elevation of water surface.		
			Spill-way crest. ¹	Lowest gate sill. ²	Beginning of month.	End of month.	Maximum.		Beginning of month.	End of month.	Maximum.
Arizona, Salt River.....	Roosevelt ³	1,575,000	2128.1	1924.6	618,626	513,138	618,626	105,488	2096.49	2086.37	2096.49
California, Orland.....	East Park.....	51,000	1199.68	1111.68	47,550	38,450	47,550	8,200	1197.76	1192.27	1197.76
Idaho:											
Boise.....	Arrowrock.....	280,000	3211	2956	281,300	280,900	283,850	340,836	3212.6	3212.5	3213.4
	Deer Flat.....	177,000	2518	2488	144,646	173,651	174,219	33,758	2514.5	2517.68	2517.7
Minidoka.....	Lake Wolcott.....	95,180	4245	4236	104,580	106,870	108,280	793,047	4245.78	4245.97	4246.08
	Jackson Lake.....	847,000	6769	6728	618,380	847,000	847,000	85,486	6759.75	6769	6769.00
Montana:											
Milk River.....	Nelson.....	70,000	2223	2200	28,000	34,000	34,000	500	2212.81	2214.77	2214.77
St. Marys storage.....	Sherburne.....	66,000	4788	4720		27,680	27,680			4760.2	4760.2
Sun River.....	Willow Creek.....	16,700	4130	4085	13,260	14,311	14,311	500	4126.4	4127.5	4127.5
Nebraska-Wyoming, North Platte.....	Pathfinder.....	1,070,000	5852	5670	812,050	1,118,600	1,120,400	215,934	5839.2	5854.16	5854.24
	Lake Alice.....	11,400	4182	4159	10,200	8,300	11,000		4180.4	4178	4181.4
	Lake Minatare.....	60,760	4125	4074	63,160	63,000	66,700		4126.1	4125.2	4126.6
Nevada, Newlands.....	Lake Tahoe.....	120,000	6230	6224					6226.87	6227.23	6227.23
	Lahontan.....	273,600	4162	4060	244,210	255,250	255,250	22,251	4158.9	4160.1	4160.1
New Mexico:											
Carlsbad.....	McMillan.....	45,000	3267.7	3241.6	7,500	4,500	8,750	12,000	3258.6	3257.3	3259.1
Rio Grande.....	Elephant Butte.....	2,638,000	4407	4231.5	1,466,947	1,553,042	1,553,042	138,739	4372.2	4374.4	4374.4
Oregon, Umatilla.....	Cold Springs.....	50,000	621.5	560	48,600	48,000	49,375	9,967	620.90	620.18	621.08
Oregon-California, Klamath.....	Clear Lake.....	462,000	4540	4514	372,000	360,000	372,000	2,000	4536.6	4536.1	4536.6
South Dakota, Belle Fourche.....	Belle Fourche.....	203,000	2975	2920	177,670	176,900	181,430	11,630	2971.6	2971.5	2972.1
Utah, Strawberry Valley.....	Strawberry.....	250,000	77558	7517	258,600	258,600	258,600		7559	7559	7559
Washington:											
Okanogan.....	Conconully.....	14,400	2290	2232	5,937	10,220	10,240	1,196	2268.9	2280.5	2280.6
Yakima.....	Bumping Lake.....	34,000	3426	3389	37,575	38,190	38,670	480	3423.9	3429.3	3429.7
	Lake Cle Elum.....	20,800	2134	2122	28,125	28,925	31,100	2,175	2135.7	2136.1	2137.04
	Lake Kachess.....	210,000	2258	2192	180,470	215,870	215,870		2248.6	2256.8	2256.83
	Lake Keechelus.....	152,000	2515	2425	152,440	155,935	158,260	2,325	2514.9	2516.2	2517.19
Wyoming, Shoshone.....	Shoshone.....	456,600	5360	5132.3	398,542	473,491	473,491	193,260	5350.9	5362.5	5362.5

¹ Or maximum storage.² Or zero storage.³ Zero water depth at elevation 1902.2.⁴ Amount of silt shown by silt survey deducted from original capacity.⁵ Proposed regulation.⁶ Estimated low-water limit under proposed plan of regulation.⁷ Elevation of reservoir raised 12 inches by stop logs in spillway.

SALT RIVER PROJECT, ARIZONA.

Operation and maintenance of irrigation system.—

Five crews were in the field during June, and the following maintenance work was accomplished: 2 miles of main canal brushed; 30 miles of main canal cleaned; 77 miles of main canal demossed; 4 miles of main canal mowed; 99 miles of laterals cleaned; one-half mile of laterals demossed; 30 miles of laterals mowed; 149 old structures repaired; 885 cubic yards of earth excavated; 1,297 linear feet of rip-rap placed; 19 cubic yards of concrete placed; 478 cubic yards of earth embankment placed.

The following construction work was accomplished from the maintenance camps: 44 new structures installed; 430 linear feet of 24-inch concrete pipe installed; 28 linear feet of 18-inch concrete pipe installed; 91 linear feet of 30-inch corrugated-iron pipe installed; 5 concrete checks installed; 144 linear feet of concrete core installed; 1 concrete automatic spillway installed; 175 cubic yards of concrete installed; 5,700 cubic yards of earth excavated; 4 miles of new waste ditch excavated; 1½ miles of new irrigation ditch excavated.

The P. & H. one-half yard dragline machine was working on the enlarging of the Indian Bend waste-way and excavated three-fifths mile of new waste ditch and 3,400 cubic yards of earth.

The concrete pipe plant manufactured 1,400 linear feet of 24-inch and 80 linear feet of 30-inch concrete pipe.

This plant ceased operations on June 23.

Operation of power system.—Total power generated during month, 8,443,800 kilowatt hours; maximum daily output June 29, 294,750 kilowatt hours; maximum load June 28, 12,925 kilowatts; maximum daily average load, 12,279 kilowatts; average load for month, 11,725 kilowatts; highest daily load factor, 98.2 per cent; lowest daily load factor, 86.7 per cent; monthly load factor, 90.7 per cent. The Roosevelt, Cross Cut, South Consolidated, and Arizona Falls power plants operated continuously. The Chandler plant operated 85.2 per cent of the time.—C. C. Cragin.

YUMA PROJECT, ARIZONA-CALIFORNIA.

The month was the coolest June since 1907. Prospects for alfalfa seed and cotton were reported excellent both as to crop and price.

The Ruth dredges cleaned 12½ miles of laterals. The first cut on the North drain was completed, 2,900 feet of drain having been excavated during the month, the excavation amounting to 18,000 cubic yards; 0.34 of a mile of the Southwest drain was completed, the excavating amounting to 9,300 cubic yards. Two flumes and one timber bridge were built across these

drains. A 75-horsepower oil engine at the Boundary pumping plant was replaced by an electric motor.

Mesa division.—A small gang was maintained at the pipe manufacturing plant for loading the pipe for hauling to the field and cleaning up forms and equipment. During the month 120 joints of 18-inch pipe were manufactured and 1,013 joints of various sizes were hauled to the field. The remaining joints on laterals B-20 and B-20-6 were sealed. Lateral B-24 was completed and a part of the pipe line on lateral B-25 was finished. In all the excavation on pipe lines amounted to 3,443 cubic yards and 2,071 linear feet of pipe were laid. The timber substructure for the No. 120 flume on lateral B-25 was completed, requiring 3,654 feet board measure of lumber in place. One concrete turnout structure was finished and two others partially completed.

Trees and cover crops made excellent progress. The second growth was showing on the citrus trees, and in some instances had already amounted to about a foot. Some trouble was caused by winds and animal pests. Fruit-bearing orchards were in very good condition.—*R. M. Priest.*

ORLAND PROJECT, CALIFORNIA.

June weather was exceptionally cool, and several showers, totaling 0.68 inch of precipitation, occurred at Orland.

Owing to moderate weather conditions the demand for irrigation water was not so heavy as usual for June, 8,100 acre-feet being delivered to water users. Maintenance work consisted mainly of mowing the unlined section of the South Canal below the headgates with the submarine weed-cutting saw for the removal of water grass and other aqueous plant growth. Mowing and burning of weeds on project laterals and rights of way was continued.

The harvest of the second crop of alfalfa was completed and the third crop was well matured at the

close of the month, with indications for a yield well above the average third cutting because of the fact that grasshoppers, which usually make serious inroads on the third crop, had not appeared in destructive numbers. The picking and drying of apricots was in progress. A heavy yield was being realized.—*R. C. E. Weber.*

GRAND VALLEY PROJECT, COLORADO.

June weather was dry and windy.

Crops were in good condition. The first cutting of alfalfa had been harvested and will probably come up to the average over the whole project. Early potatoes made an excellent growth and were nearly ready for digging. They will come on the market about two weeks earlier than usual. Prospects were excellent for satisfactory yields and fair prices. Sugar beets also made a good growth and promised an excellent yield. An additional bonus payment of \$1 per ton on last season's crop was made by the Holly Sugar Co., which brings the total payment to date up to \$9 per ton.

On account of the extremely dry, windy weather the demand for water was excessive. The maximum diversion amounted to approximately 900 second-feet, of which 250 were delivered to the Orchard Mesa district, 120 to the Palisade and Mesa County districts, and the remainder to the project. The principal maintenance work was the riprapping and raising of canal banks, the removal of silt, and repairs to wooden structures.

Two Monaghan 1-T drag lines were operated on project drains on a two-shift basis. Six thousand two hundred and eighty linear feet of drain were completed, involving 22,000 cubic yards of excavation. Drainage investigations were started in the Orchard Mesa irrigation district and plans made to begin construction of one of the main drains in the near future.

Crop report, Yuma project, Arizona-California, 1922.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay.....	22,735	Ton.....	48,333	2.13	\$14.00	\$676,666	\$29.77
Alfalfa seed.....	16,475	Pound.....	3,482,665	212	.15	522,400	31.71
Barley.....	240	Bushel.....	5,295	22.06	.71	3,785	15.77
Corn sorghum.....	3,470	do.....	103,672	29.88	.89	92,125	26.55
Cotton.....	21,420	Pound.....	4,225,000	197	.25	1,056,250	49.31
Cottonseed.....		Ton.....	3,800		21.00	79,800	3.72
Fruit.....	90					10,012	111.24
Garden and truck.....	650					38,076	58.38
Hay (except alfalfa).....	235	Ton.....	833	3.55	3.93	3,270	13.91
Pasture.....	5,945	Acre.....				118,900	19.10
Wheat.....	1,030	Bushel.....	18,752	18.20	1.14	21,416	20.79
Sugar cane.....	15	Acre.....				4,800	320.00
Dates (nursery stock).....	35	do.....				15,000	428.57
Pasturing alfalfa and stalk lands.....						40,000	
Less duplicated areas.....	18,370						
Total cropped.....	53,970	Total and average.....				2,682,500	49.70
			Areas.		Acres.	Farms.	Per cent of project.
			Total irrigable area farms reported.....		58,000		93
			Total irrigated area farms reported.....		53,970	1,216	
			Under water right applications.....		46,470	949	
			Under rental contracts.....		7,500	267	
			Total cropped area farms reported.....		53,970		

On the reconstruction of the Orchard Mesa irrigation system the operating house for the wasteway machinery in the Colorado River siphon was completed and the installation of the machinery was in progress. A small force was employed in building gravel bins and other work preparatory to next season's construction operations.—*S. O. Harper.*

UNCOMPAHGRE PROJECT, COLORADO.

Only one shower occurred during June, the total precipitation amounting to 0.12 of an inch.

The uncollected water rental accounts due on account of irrigation water furnished during the season of 1921 remains at \$1,207.28. The total cash collections on June 30 on account of irrigation water furnished during the season of 1922 amounted to \$103,604.43.

The P. & H. drag line was engaged on the cleaning and enlargement of West Canal, the removal of slides from the Ironstone Canal, mile post 1, cleaning of gravel and improvement of river section at the Ironstone headworks, and on the change in location of the C. J. lateral on Spring Creek mesa. The *Ruth* dredger completed the enlargement and cleaning work on the C. J. A. lateral, and work was begun on the enlargement and cleaning of the C. J. lateral. All the project canals and laterals were operated continuously with the exception of the Ironstone extension, on which canal the failure of a flume bent necessitated the shutting down of the water supply for a period of about two days.

The work of driving 30 feet of protective round piling on the right bank of the Uncompahgre River below the Loutsenhizer Canal sluiceway was completed.

Miscellaneous maintenance work included the grading and leveling of the Loutsenhizer, West Canal, and C. J. A. lateral banks, and rock-basket riprap around pier No. 1 of the West Canal flume across the Uncompahgre River.

It was necessary during the entire month to divert water from the Gunnison River into the Uncompahgre Valley in order to maintain the head necessary for irrigation purposes. This was unusual for the reason that ordinarily the peak flow of the Uncompahgre River occurs during the middle of the month, but owing to the unfavorable weather conditions the melting of high snows on the Uncompahgre watershed was retarded so that there was no high water in that stream. The head necessary to carry in the tunnel varied according to the stage of the river, the maximum quantity carried amounting to 875 feet, which was supplied for 5 days, and 725 feet, which was supplied for 13 days.—*L. J. Foster.*

BOISE PROJECT, IDAHO.

There was more rainfall during June than for a like period for the past 12 years.

The alfalfa weevil damaged the first cutting of alfalfa in the western portion of the project. The damage to this crop from frequent showers was heavy.

The head-lettuce crop was harvested. The shipments made early in the month were of excellent quality and commanded good prices. That portion maturing the latter part of the month was injured by slime caused by showers followed by hot, clear weather.

Prospects were good for a heavy crop of all kinds of grain, potatoes, and fruit. Some dealers made offers to contract for potatoes with an advance pay-

ment, but it was not known that any contracts have been closed.

Ranges were reported in excellent condition. It was expected that early lambs and some beef cattle would come from the range in good market condition.

Moss began bothering in some of the canals during the latter part of the month but was removed by means of disk harrows. Owing to cool, damp weather the demand for irrigation water during the month was below normal.

The flow of Boise River was fairly uniform and averaged about 6,000 second-feet. The total discharge of the stream was 28 per cent below the mean for the past 27 years. Reports from the Boise drainage basin indicated that there was not much snow left, but both Arrowrock and Deer Flat Reservoirs were full at the close of the month, which insures an ample water supply for the balance of the season.

Drainage work was continued in the vicinity of Wilder. P. & H. No. 208 and Austin No. 4 drag lines were in operation during the entire month. The erection of a transmission line and the installation of transformers were completed for the use of an electric-driven class 9½ Bucyrus drag line. It was expected that this machine would be in operation early in July.

Congressmen Lewis C. Cramton and Burton L. French, of the Appropriation Committee, visited the project on June 24 and 25.—*J. B. Bond.*

KING HILL PROJECT, IDAHO.

June weather was exceptionally cool. Conditions for construction work were good, but the late rains damaged the hay crops more or less.

The force of 111 men on the 1st was cut to 30 men at the end of the month. Four of the five camps operating at the beginning of the month were dismantled by the 20th and men from the one camp completed construction work under way.

Government forces completed all unfinished construction items, including the lined chute and eight rubble drops on lateral 11½, backfill of wood-stave pipe lines on lateral 9-B, grouting of chute on lateral 3½-E, earthwork on lateral 3-E, and 1,000 feet of metal flume on lateral 3-E; four rubble drops were put in on lateral 15-E, 24-inch lock-joint concrete-pipe siphon was installed under railroad tracks at lateral 11-E, including inlet and outlet structures and blow-off chamber. Six weirs were installed at the Slick pipe line and 20 weirs and 12 turnouts installed in the main canal and laterals. Canal banks were reinforced at several points above station 800 and repairs made to the Slick pipe line by placing 30 new collars. All construction work contemplated on the project was completed by June 30 and the project put on an operation and maintenance basis as of July 1.

Uninterrupted service was maintained in the system above Little Alkali siphon throughout the month. A break at this structure necessitated turning the water out below this point from June 24 to 30, on which date full head was again delivered to lands below this point. No serious damage resulted to crops by reason of the break.—*A. M. Rawn.*

MINIDOKA PROJECT, IDAHO.

June weather was mainly rainy and warm and crops made a good growth.

Jackson Lake was filled to its capacity of 847,000 acre-feet on the 22d. Normal flow water was re-

leased from the reservoir, however, on the 19th. Lake Walcott was maintained practically at capacity.

On account of rainy weather the demand for water was greatly reduced. The total amount pumped at the first lift was 36,353 acre-feet, the discharge varying from 405 to 750 second-feet.

The Secretary of the Interior signed a contract with the Idaho Power Co. providing for the purchase of two of the company's plants at American Falls and the acquisition of certain power rights at American Falls and elsewhere for the sum of \$1,000,000, payable in four annual installments. Three of these installments have been paid, so as to take advantage of the discount allowed on advance payments. Contracts with the American Falls Reservoir district and the Empire Irrigation district were also signed by the Secretary. After these contracts were signed vigorous efforts were made at American Falls to contract for the purchase of as much right of way as possible. Agreements were made with owners for property valued at \$590,000, making the total amount of right of way purchased or contracted for to date \$820,000.—*Barry Dibble.*

HUNTLEY PROJECT, MONTANA.

Weather conditions during June were the most favorable to agricultural operations which have obtained for a number of years.

Routine work in delivery of water comprised the only activity during the month. The hydraulic pumping plant delivered sufficient water to the pumping division, except from the 13th to the 17th, when the auxiliary plant was required in order to supply the demand. The requests for water were very light after the 17th until the end of the month.—*A. R. McGinness.*

Crop report, irrigated farms, Milk River project, Montana (exclusive of Chinook division and St. Mary storage), 1922.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.			
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.	
Alfalfa hay.....	4,365	Ton.....	7,106	1.6	\$10.00	\$71,060	\$16.28	
Alfalfa seed.....	164	Bushel.....	154	9	18.28	2,822	17.20	
Barley.....	25	do.....	400	16.0	.40	10	6.40	
Beans.....	25	do.....	355	14.2	4.80	1,704	68.16	
Beets, sugar, and mangles.....	3	Ton.....	17	5.7	5.00	85	28.33	
Clover hay (sweet).....	17	do.....	27	1.6	6.04	163	9.59	
Corn.....	95	Bushel.....	3,410	35.9	1.00	3,410	35.90	
Corn fodder.....	78	Ton.....	122	1.6	6.00	732	9.39	
Flax.....	83	Bushel.....	440	5.3	2.00	880	10.60	
Fruits, small.....	1					160	160.00	
Garden.....	34					5,845	172.00	
Hay.....	10,610	Ton.....	6,761	.6	11.00	74,371	7.01	
Oats.....	723	Bushel.....	11,651	16.1	.45	5,243	7.25	
Pasture.....	158					1,000	6.33	
Potatoes.....	205	Bushel.....	28,227	137	.45	13,153	64.16	
Wheat.....	1,931	do.....	21,757	11.3	.98	21,322	11.04	
Less duplicated areas.....	367							
Total cropped.....	18,150	Total and average.....					202,110	11.14
Young alfalfa.....	57							
Less duplicated areas.....	37							
Total irrigated.....	18,170		Areas.			Acres.	Farms.	Per cent o project.
		Total irrigable area farms reported.....				34,902	1209	36
		Total irrigated area farms reported, under rental contracts.....				18,170	209	19
		Total cropped area farms reported.....				18,150	209	19

MILK RIVER PROJECT, MONTANA.

Precipitation of 7.98 inches at Malta for June exceeded that of any previous month since June, 1906, when 9.33 inches of rain fell. The maximum for 24 hours was on the 24th, with a record of 3.25 inches during the night. June precipitation at Chinook and Glasgow was 6.84 and 10.29 inches, respectively. Flood conditions prevailed over much of the valley during the last 10 days of the month virtually preventing construction work or farm operations.

Construction by Government forces was limited to placing a few small structures and fabricating a number of wooden structures in the yard. Two small earthwork contractors and one structure contractor made fair progress for the first 20 days, but were forced to suspend work, and suffered some loss of materials and damages to partially completed work during the last 10 days of the month.

Seventeen hundred acre-feet of water were delivered to 70 farmers on the Malta and Glasgow divisions, and 6,500 acre-feet were diverted by the canals on the Chinook division. The principal items of maintenance were cleaning of Vandalia Canal at about mile 35 by P. & H. drag line, which moved an average of 342 cubic yards per shift for 17 shifts and cleaning the DN-1 drainage ditch near Dodson by P. & H. drag line, which moved 173 cubic yards per shift for 6½ shifts. The *Ruth* dredger finished cleaning laterals on the Glasgow division about June 4 and was shipped to Bowdoin, but flood conditions prevented putting it into commission on the Bowdoin laterals.—*Geo. E. Stratton.*

ST. MARY STORAGE.

During June weather conditions were unfavorable for outside work. Rain fell on 16 days and the weather was generally cold.

¹ 105 farms more than 50 per cent irrigated; 104 farms less than 50 per cent irrigated.

St. Mary Canal was operated the entire month as necessary to supply water for the project—27,729 acre-feet were diverted from St. Mary River and 24,604 delivered to the North Fork of Milk River.

The gates at Sherburne Lakes Reservoir were closed on the 11th and at the end of the month the storage amounted to 47,680 acre-feet.

Construction work consisted of completing the approaches to a bridge across the lower end of St. Mary Canal, and maintenance work consisted of raising and strengthening banks on the 16th mile of the canal and resetting telephone line.—*R. M. Snell.*

SUN RIVER PROJECT, MONTANA.

The weather for June was generally cool with frequent showers during the first half of the month and heavy rains during the last half. The precipitation at Fort Shaw was 5.22 inches, the greatest of record for the month of June.

Irrigation on the Fort Shaw division was light at the beginning of the month, but increased rapidly, and on the 16th the main canal was diverting 235 second-feet. Over 4 inches of rain fell in the week following, and at the close of the month the quantity diverted had been reduced to 25 second-feet. On the Greenfields division water was not available until June 23, and because of frequent rains there has been no demand for water. Crops were in fine condition, but the first cutting of alfalfa, which was being harvested, will be a little below average in weight. The grasshoppers damaged some crops, but favorable conditions for crop growth put most crops beyond the damage point. A good deal of work was done in spreading poison and the bureau worked with the farmers in poisoning ditch banks.

The contractor on structures, part two, Greenfields division, made slow progress. The westerly

portion of new work will be in shape so that water can be delivered beginning about July 8. On drainage work open drain C was completed and the gasoline drag line will be moved to drain B and changed from gasoline to electrically operated. The electrification of the second drag line had been completed and the transmission line finished so that it will be possible to test this machine and begin the excavation of drain B early in July. The repair job on Greenfields main canal was finished June 22 and water started through the new work on the following day.

Carload shipments were light and comprised 9 cars of wheat, 2 of potatoes, and 1 of hay.—*Geo. O. Sanford.*

LOWER YELLOWSTONE PROJECT, MONTANA-NORTH DAKOTA.

June weather was favorable for construction work and for growing crops. The precipitation of 4.56 inches was about $1\frac{1}{2}$ inches more than normal, and was well distributed. Crops were in excellent condition except in some localities where grasshoppers were working. Insufficient hand labor caused late thinning of some beet fields, resulting in damaged stands. The first cutting of alfalfa was in progress.

Operation of the canal system for delivery of water was continued throughout the month, 4,871 acres being irrigated. The heavy rainfall greatly reduced the demand for water.

Maintenance work consisted of the removal of a small slide at Arkle Point by drag line. The *Ruth* ditch cleaner was operated two shifts and made good progress. Some lateral banks were raised by team methods, the laterals being cleaned at the same time. Numerous small structures were replaced or repaired. The stalling pool below the Hay Creek wasteway washed out and was replaced without damage to the main structure. Three flumes constructed of zinc metal have given trouble by reason of the joints

Crop report, dry-farmed units, Milk River project, Montana (exclusive of Chinook division and St. Mary storage), 1922.

Crop.	Area (acres).	Unit of yield.	Yields.			Values.	
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay.....	1,892	Ton.....	2,234	1.2	\$10.00	\$22,340.00	\$11.81
Alfalfa seed.....	83	Bushel.....	95	1.1	13.55	1,288.00	15.52
Barley.....	119	do.....	1,257	10.6	.40	503.00	4.23
Beans.....	28	do.....	67.5	2.4	4.80	324.00	11.49
Clover hay (sweet).....	50	Ton.....	55	1.1	5.27	290.00	5.80
Clover seed (sweet).....	6	Bushel.....	11	1.8	12.00	132.00	22.00
Corn.....	238	do.....	4,798	20.1	1.00	4,798.00	20.16
Corn fodder.....	412	Ton.....	831	2.0	6.00	4,986.00	12.10
Flax.....	581	Bushel.....	483	1.8	2.00	966.00	5.66
Garden.....	28	do.....	.....	.....	.....	3,590.00	128.22
Hay.....	5,605	Ton.....	3,288	.6	11.00	36,167.00	6.45
Oats.....	1,206	Bushel.....	12,762	10.6	.45	5,743.00	4.76
Pasture.....	19	do.....	.....	.....	.....	82.00	4.32
Potatoes.....	581	Bushel.....	22,929	88.0	.45	10,318.00	89.83
Rye.....	224	do.....	1,112	5.0	.47	523.00	2.33
Wheat.....	4,422	do.....	47,541	10.8	.93	46,590.00	10.54
Less duplicated areas.....	137	do.....	.....	.....	.....	.....	.....
Total cropped.....	14,160	Total and average.....	.....	.....	.....	138,640.00	9.79
Young alfalfa.....	255	Areas.....	Acres.....	Farms.....	Per cent of project.....	.....	.....
Young sweet clover.....	20	.....	.....	.....	.....	.....	.....
Less duplicated areas.....	185	.....	.....	.....	.....	.....	.....
Total cropped.....	14,250	Total irrigable area farms reported.....	26,745	195	.....	.....	.....
.....	.....	Total cropped area farms reported.....	14,160	195	.....	.....	.....

¹ 89 farms dry-farmed; balance of area included in 106 farms partially irrigated.

slipping apart. Several small washouts near the lower end of the main canal were repaired.

Construction work progressed with fair progress. The principal item of work by Government forces was placing wooden turnouts on the extension laterals. Contractor John Penson completed his contract for main canal checks under advertisement No. 55; John Klug made good progress on his contract under the same advertisement and had about finished. Gene Hoffstot and Henry Swanson made fair progress on their earthwork contracts, but were delayed somewhat by frequent rains.—*H. A. Parker.*

NORTH PLATTE PROJECT, NEBRASKA-WYOMING.

On the Interstate division water was run throughout the system, Lake Alice and Lake Minatare being filled during the early part of June. The demand for water was light on account of heavy rains. Pathfinder Reservoir was filled to overflowing by the 18th.

On the Fort Laramie division water was shut out below the power plant for four days to repair a pipe culvert at mile 34.9. As little water was being used, no crops suffered.

Maintenance work consisted of leveling banks and ripping canal banks and structures.

On the Northport division the canal was operated throughout the month, the demand for water, however, being light.

On the Interstate division main canal enlargement was in progress with the Bucyrus class 14 drag line and one Monighan drag line. One Monighan drag line and two P. & H. drag lines were transferred from canal enlargement to drainage work. The replacement of wooden lateral structures with concrete on the third lateral district was being carried on by contract. On the Fort Laramie division two electric drag lines were employed on canal excavation on the Gering Valley work, two gasoline drag lines and one electric drag line on drainage work, and one gasoline drag line on structure work.

Good progress was made on the Browns Canyon siphon. The excavation on the east side of the canyon was completed and 80 cubic yards of concrete placed in the outlet and footings; 300 segments were made for barrel forms. All laterals west of Stivers Canyon had been located, cross-sectioned, and the earthwork contracted. The lateral system between Stivers Canyon and tunnel No. 3 had been located and will be advertised at once. At the Kiowa siphon the work of moving camp was completed and 40 cubic yards of concrete were placed in the outlet of the structure. All the pile had been driven for the stilling basin of the Gering drain chute and 105 cubic yards of concrete placed in the chute section. At the north portal of tunnel No. 3 six linear feet of tunnel had been excavated and the timbers placed, and 18 linear feet of tunnel had been excavated and the timbers placed at the south portal.

The crops over the project were in general very good, except the beets that were replanted. They were a failure on the lighter soils.—*Andrew Weiss.*

NEWLANDS PROJECT, NEVADA.

Weather conditions during June were quite unfavorable, being unsettled and cold. Some frost damage to cantaloupes and garden truck was reported. Rain delayed the first cutting of alfalfa somewhat, but conditions were more favorable at the end of the month and haying was in progress over the project.

The delivery of water for irrigation was light and below normal for the month, mainly due to the cool weather.

Good progress was made on preliminary work for the installation of the new 78-inch steel penstock for the Lahontan power plant, the excavation of the tunnel under the left Lahontan Dam spillway being completed. More rapid progress will await the delivery of the penstock steel, cement, and other supplies.

Drainage forces continued the construction of deep open drains under the contract with the irrigation district. Seven drag-line excavators were in operation, 232,500 cubic yards of material being moved; 74,326 feet of lumber was used in placing 59 structures in drains.

Location of the feed canal for the Spanish Springs Reservoir was completed and the Reno office closed on June 26. Two parties which were used on this work were reorganized, and on June 27 were located at Wadsworth and Hazen, Nev., for the outlining on the ground of the upper limits of the irrigable area in the Pyramid, Lovelock, and Lahontan Bench divisions proposed to be irrigated from Spanish Springs Reservoir.

Negotiations for the purchase of right of way in the Spanish Springs Reservoir site were in progress.

The Ruth dredger finished its ditch cleaning program for the season. Maintenance forces installed 3 and repaired 20 minor timber structures, cleared moss from 17 miles of laterals and weeds and brush from 4½ miles of drains, repaired 7 minor breaks in laterals, and improved 4.6 miles of operating roads in the Soda Lake district.

The paving of over a mile of the streets of Fallon under Federal aid was practically completed and in use at the end of June.—*John J. Richardson.*

CARLSBAD PROJECT, NEW MEXICO.

The regular maintenance foreman, with a few men, was employed the first part of June cleaning portions of D drain. The same force was employed the latter part of the month cleaning laterals of weeds and grass, the growth of which developed very rapidly during the hot weather of the past few weeks.

The harvesting of the first crop of hay was completed early in the month and about 50 per cent of the second crop was harvested at the close of the month. The second crop of hay was heavy and of excellent quality. The price of hay advanced from \$14.50 to \$15 per ton f. o. b. the project during the month. The cotton crop advanced rapidly and conditions averaged about 72 per cent. The June crop report was completed about the 15th, and the total acreage in crops amounted to 23,635, as follows: Alfalfa, 5,431; cotton, 17,087; miscellaneous, 1,117.—*L. E. Foster.*

RIO GRANDE PROJECT, NEW MEXICO-TEXAS.

Construction activities during June were divided between drainage systems and lateral systems. The Monighan 1-T excavator in the Rincon Valley was employed on sublaterals. A Ruth ditching machine began construction on old laterals. In the Mesilla Valley three excavating machines continued on drain construction. The Monighan 2-T and two Bucyrus 9½ excavators removed a total of 156,500 cubic yards from 2.93 miles of drain. Two P. & H. 206 excavators, one of which was received new during the month, were employed on lateral construction, and

a third was employed on combined lateral and levee construction. The Ruth ditching machine was employed partly on construction and partly on maintenance; 40,400 cubic yards were placed in 5.8 miles of laterals or levees, and the Ruth bermed 8,750 cubic yards in 4.4 miles of lateral. In the El Paso Valley two Bucyrus 9½ excavators were employed on drain construction, moving 88,750 cubic yards from 9,090 feet. The P. & H. excavator was employed on strengthening banks of the Island feeder canal. The Bucyrus 30-B excavator placed 23,097 cubic yards in 16,590 feet of Tornillo levees. The Ruth ditching machine removed 11,700 cubic yards from 5.4 miles of lateral.

Water was delivered continuously for irrigation purposes. The increase in storage was very low, considering it was expected to be the maximum in June. At the end of the month the inflow was falling off rapidly and a very low reservoir was anticipated by the end of the irrigation season.

Crops of all kinds were very promising. The melon crop will come in in about two weeks earlier than in previous years, with shipments beginning about July 20.—*L. R. Fiock.*

NORTH DAKOTA PUMPING PROJECT.

June weather conditions in general were good. Not more than four days passed in any period without some rain; the total precipitation was 5.93 inches.

The first water deliveries to water users were made June 13. The acreage irrigated was small, as the first crop of alfalfa was too far advanced for irrigation before cutting.

In addition to pumping operations the power plant was operated for commercial power; 77,150 kilowatt-

hours of energy were sold to the city of Williston, representing 4,000 kilowatt-hours more than in the same month of last year.

For this work the coal mine was operated to produce fuel and 1,127 tons were mined.—*Wm. S. Arthur.*

UMATILLA PROJECT, OREGON.

The first three weeks in June were cool with considerable rain and cloudy weather. During the last week the weather changed abruptly and typical mid-summer weather prevailed.

Harvesting of the first crop of alfalfa was delayed by rain. Considerable hay was hauled to the local mill direct from the field after curing in the shock. Spraying and thinning of apples was general among orchardists. Irrigating for the second crop of alfalfa kept the demand for water near the peak.

At the beginning of the month the Umatilla River had dropped till every available second-foot was being diverted for irrigation. By the 3d of the month, following heavy rains and snow in the Blue Mountains, the river had risen to moderate flood stage. Intermittent rains during the greater part of the month insured an adequate supply of water in the river to meet all demands. Advantage was taken of the abundant water supply to keep Cold Springs Reservoir nearly full in spite of demands on it for irrigation.

Owing to farming operations under way during the month there was a shortage of labor, which somewhat delayed the manufacture of concrete pipe and retarded the construction program.

The feed canal was operated throughout the month. All canals and laterals of the distribution systems on the east and west divisions were operated to capacity

Crop report, Umatilla project, Oregon, 1922.

Crop.	Area (acres).	Unit of yield.	Yields.			Values.	
			Total.	Average (per acre).	Per unit of yield.	Total.	Per acre.
Alfalfa.....	10,366	Tons.....	39,094	3.8	\$9.95	\$388,987	\$37.52
Alfalfa, seed.....	70	Bushels.....	239	3.4	14.23	3,401	48.59
Apples.....	586	Pounds.....	587,100	1,002	.023	13,503	23.04
Apricots.....	5	do.....	12,900	2,580	.085	710	142.00
Barley.....	10	Bushels.....	1,775	29.6	.88	1,562	26.03
Clover hay.....	10	Tons.....	30	29.6	10.00	2,898	30.00
Corn, Indian.....	123	Bushels.....	4,468	36.3	.86	3,842	31.24
Corn, fodder.....	61	Tons.....	524	8.6	5.53	2,898	47.51
Fruits, small.....	11	do.....				6,634	103.66
Garden.....	234	do.....				26,265	112.24
Hay.....	73	Tons.....	110	1.5	11.00	1,210	16.58
Oats.....	2	Bushels.....	100	50	.60	60	30.00
Pasture.....	35	do.....				18,167	24.82
Peaches.....	35	Pounds.....	40,225	1,321	1.33	1,756	50.17
Pears.....	7	do.....	1,000	143	.05	50	7.14
Prunes.....	12	do.....	10,400	867	.04	416	32.00
Potatoes.....	176	Bushels.....	19,131	108.7	.70	13,392	76.09
Wheat.....	64	do.....	1,894	29.6	1.00	1,894	29.59
Miscellaneous.....	24	do.....				1,213	50.54
Less duplicated areas.....	315						
Total cropped.....	12,390		Total and average.....			486,260	39.24
Nonbearing orchard.....	47						
Young alfalfa.....	650						
Fall-plowed.....	36						
Miscellaneous.....	215						
Less duplicated areas.....	68						
Total irrigated.....	13,270						
			Areas.	Acres.	Farms.	Per cent of project.	
			Total irrigable area farms reported.....	19,227	558	67.9	
			Total irrigated area farms reported.....	13,270	558	46.9	
			Under water-right applications.....	12,750	544	45.1	
			Under rental contracts.....	520	10	1.2	
			Miscellaneous.....	180	9	.6	
			Total cropped area farms reported.....	12,390	558	43.8	

by the usual force of water masters and ditch riders. Small field crews were employed on both divisions mowing, cutting weeds, and repairing structures and breaks.

East division lateral extensions.—Work was continued on this feature, one crew working, resulting in the excavation of 1,164 cubic yards of class 1 and 10 cubic yards of class 3 material, backfilling of 2,174 cubic yards of materials and laying of 2,115 lineal feet of 20-inch; 1,980 lineal feet of 16-inch, and 1,143 lineal feet of 12-inch concrete pipe; 14 minor structures containing 25 cubic yards of concrete were built. Because of the scarcity of labor the pipe manufacturing plant was operated intermittently during the month, and 246 lineal feet of 20-inch concrete pipe and 13 two-foot turnouts were made.

West division lateral system.—Work was continued on this feature and 740 cubic yards of class 1 material excavated; 1,415 cubic yards of backfill placed; and 140 lineal feet of 16-inch and 2,093 lineal feet of 15-inch concrete pipe were laid; two minor structures containing 5 cubic yards of concrete were built.

Mr. Oliver Boyd, of the firm of Aaron Sapiro & Levy, of San Francisco, gave an interesting and convincing talk on the benefits of cooperative marketing to a representative audience of farmers and business men. In a two-hour speech Mr. Boyd told of the California method of cooperative marketing; how it had lifted whole counties from poverty to affluence. He dwelt on the fact that the system if applied to any other State would have the same success. Some of the salient points of Mr. Boyd's talk were that community cooperative movements for marketing crops were doomed to failure; that all local organizations should be affiliated with a central organization. An attempt to organize the hay growers of the Northwest was in progress.—*H. M. Schilling.*

KLAMATH PROJECT, OREGON-CALIFORNIA.

The weather during the fore part of June was generally unfavorable for crop growth. The last killing frosts occurred on the 12th, 13th, and 18th. The demand for water was hardly up to normal.

In the Tule Lake division studies and investigations were continued to determine soil conditions and methods of draining this area. During the past two months a soil classification has been made of about 52,000 acres of the Tule Lake lands by Mr. Scott Ewing, of the Bureau of Soils.

In the Langell Valley division the work at Malones Dam has been completed; the construction forces were disbanded on June 15. The work of digging test pits to explore the foundation conditions for the Gerber Dam was completed on June 7. The foundation conditions were found to be suitable for the variable radius arch dam contemplated. The Gerber Dam will be about 90 feet high and will contain about 10,000 cubic yards of concrete. A contract was made for the machinery for the hydraulic pumping plant at the lower end of the West Canal. Contract was pending for furnishing, hauling, and installing a concrete pipe line about 30 inches in diameter and 3,100 feet long for serving lands in the Dry Lake area. Advertisement will shortly be issued inviting bids for the building of about 14 miles of laterals in the northern end of the valley.—*Herbert D. Newell.*

BELLE FOURCHE PROJECT, SOUTH DAKOTA.

June weather was favorable to crop growth and for harvesting the first cutting of alfalfa until the last

week, when showers became too frequent for the proper curing of hay.

All canals were in operation, but the demand for water was light, owing to copious showers during the first and last weeks of the month. Requests for water were scattering and the heads small. Only about 12,000 acre-feet were diverted for irrigation purposes.

Maintenance work consisted in repairs and replacements to minor wooden structures. One concrete chute 125 feet long and of 5-second-feet capacity was built.

On account of heavy floods on Cheyenne River disturbing the delivery of sand for the reconstruction of parapet wall on the dam, only about 400 feet of progress was made.

The crop prospects both on the project and the dry area were very encouraging. The first cutting of alfalfa had largely been harvested and most of it went into the stack without damage from rain. The yield was good. Condition of corn and small grains was satisfactory.—*B. E. Hayden.*

Prevailing crop prices at close of June, 1923.

Project.	Alfalfa hay, per ton.		Barley, per bushel.	Oats, per bushel.	Wheat, per bushel.	Potatoes, per bushel.
	In stack.	Baled at shipping point.				
Salt River.....	\$10-\$11	\$12-\$13	\$0.80	\$0.58	\$1.14	\$3.00
Yuma.....	10.00	14.50			1.11	
Orland.....	9.00	13.00	.62		.93	
Grand Valley.....	10.00	13.00			.75	
Uncompahgre.....						
Boise.....	7.00	10.00	.60	.55	.96	.60
King Hill.....	8.00					13.00
Minidoka.....	5.50	9.00	.90	.48	.96	13.00
Huntley.....						
Milk River.....	9.00		.35	.50	.95	.90
Sun River.....	8.00	11.00	.72	.70	.90	.20
Lower Yellowstone.....			.30	.24	.93	
North Platte.....						
Newlands.....	9.00	14.00				
Carlsbad.....		15.00				
Rio Grande.....		17.00				
North Dakota pumping.....	15.00			.33	.90	.35
Umatilla.....		16.00				
Klamath.....			.77	.77	1.05	
Belle Fourche.....					.90	
Strawberry Valley.....	10.00	14.00	1.00	.75	1.20	12.40
Okanogan.....	16.00					
Yakima.....						
Riverton.....			.96	.72	1.30	
Shoshone.....		12.00			.65	.27
Indian projects:						
Blackfoot.....	10.00			.50	.94	
Flathead.....	8.00	14.00			.90	.45
Fort Peck.....	10.00			.50		.50

STRAWBERRY VALLEY PROJECT, UTAH.

June weather was exceptionally cool, with intermittent storms during the fore part of the month. Frost occurred on the 1st but resulted in no damage except to garden truck. The continued cold weather retarded to some extent the growth of sugar beets and fall wheat. Fruit, however, continued to ripen in excellent condition, and generally all irrigated crops made good progress. The first cutting of alfalfa was harvested, with excellent crop reported. Picking of the cherry crop had begun, prices varying from 7 to 10 cents.

During June, 30,610 acre-feet of water were delivered for irrigation purposes to the several divisions of the project, 25,312 acre-feet of which were diverted from the natural flow of the Spanish Fork River.

The project power plant was in continuous operation, furnishing under contract 79,055 kilowatt-hours to the several project towns. Commercial power contract with Springville City was renewed for another three-year period.

Tentative arrangements had been entered into between the Forest Service and Utah County for co-operative maintenance work on the Diamond Fork Road.

During the month 49 boat licenses for operation of boats on Strawberry Reservoir were issued.—*W. L. Whittemore.*

OKANOGAN PROJECT, WASHINGTON.

Heavy rains which occurred from the 1st to the middle of June made irrigation unnecessary and gave a precipitation on the project of 2.86 inches, which is above normal for the month. The maintenance crews were used at Conconully in the setting up of the Salmon Lake pumping plants and the building of flume in connection with these plants. The canals were operated from the 21st to the last of the month and at about 80 per cent of their capacity.

The electrical pumping plants were operated a portion of the month for irrigation and a little during the time the canals were shut off for the purpose of furnishing spray water. Salmon Lake pumping plant was operated from June 7 to June 19.

Labor and transportation conditions were good, with sufficient labor for all reclamation and farm work; shipments were made promptly and delivered in reasonable time.

The 1923 crop gave promise of being as large as that of 1922, and the district horticultural inspector estimated that it would be slightly larger than last year's crop.—*Calvin Casteel.*

YAKIMA PROJECT, WASHINGTON.

For the most part, June was cool and cloudy, with frequent light showers.

Granger irrigation district.—The main siphon (a 33-inch diameter reinforced concrete lock-joint pipe line, about 14,000 feet long) was completed during June, and all manholes, cut-off collars, and structures up to the drain crossing were installed. Good progress was also made on the lateral system, the work consisting of excavation of trench; laying of 33, 24, and 18 inch pipe in quantities of 247, 150, and 137 linear feet, respectively; also placing of 345 cubic yards of concrete lining.

Sunnyside division.—Delivery of water was continuous, with a decrease in the demand, owing in part to prevailing cool, cloudy weather, and in part to cutting and stacking of hay and picking of cherries. A sudden rise in temperature at the close of the month increased the demand for water. Operation of the several pumping plants was uninterrupted, except for short intervals at the Outlook plant, to clean the pumps, and at the Grandview plant, where the hydraulic unit was closed down for about two hours for repairs. Maintenance work was confined almost entirely to removal of weeds and moss from the distribution system.

Tieton division.—Water service was continuous. Demand for water was light, owing to cool, cloudy weather, and during the haying period from June

10 to 25 a number of the water users requested delivery of only a part of their schedule allowance. Maintenance work consisted of the renewal in kind of 20 wood-measuring boxes and replacing of 10 with concrete structures, and installation of 6 special concrete-measuring devices at the expense of water users requesting them. Five hundred linear feet of 8-inch wood stave pipe were installed and repairs made on small nonreinforced concrete and wood pipe, involving patching with concrete, replacement of wood collars, or renewal of a few joints of pipe. Other work done included removal of silt, cutting of weeds, and repair of telephone lines.—*J. L. Lytel.*

TIETON DAM.

Progress on Tieton Dam was below normal during June owing to the necessity of moving borrow pit tracks from elevation 2845 to 2875.

Forty-six thousand cubic yards of earth embankment and 17,000 cubic yards of rock fill were placed; 1,140 cubic yards of concrete were placed in the core wall.

Good progress was made in reservoir clearing; 75 men and 30 head of work stock were employed on Government force clearing, and 20 small contractors were operating throughout the month.

The sawmill was run throughout the month, averaging 20,000 feet board measure per day.

Sufficient labor was secured by shipping from Seattle.

The average force employed numbered 465 men.—*F. T. Crowe.*

RIVERTON PROJECT, WYOMING.

Weather and road conditions during June were generally favorable for construction. The flow of Wind River was about equal to the mean of previous years for the month of June. The supply of common labor was slightly in excess of the requirements.

Concrete lining of the Wyoming Canal below station 170 was the main work in progress during the month. Trimming of the canal slopes was continued, a new camp was established at Midwest Draw, a crushing and screening plant was set up, and a concrete plant was assembled. Actual placing of concrete was started on June 18 and by the end of the month 493 cubic yards had been placed in 780 linear feet of canal.

Excavation for the Midwest siphon was practically completed, lumber for the forms was cut, and the construction of concrete pedestals for supporting the reinforcing steel and inside siphon forms was commenced.

The Bucyrus class 14 drag line was engaged in trimming slopes for concrete lining, excavating for the Midwest siphon, and digging the uncompleted portions of the Wyoming Canal between stations 30 and 40. The new Koehring 1-yard drag line was practically inactive owing to a complete breakdown of the engine, which necessitated the installation of a new engine.

For facilitating construction and survey work, 3.5 miles of road along the Wyoming Canal were regraded and the same amount of new road was constructed east of the proposed drop into Pilot Butte Reservoir.

Toward the close of the month two survey parties were started on location work, with Engineer Walter N. Hill, formerly of the Denver office, in charge.—*Arthur Ruettgers.*

SHOSHONE PROJECT, WYOMING.

June was cool. Precipitation was confined to a few rains. A thunderstorm on the 22d, accompanied by hail over portions of the project, did considerable damage to gardens, alfalfa, and beans, and retarded the sugar beets in the area affected.

Concrete work on the Willwood Dam proper was completed during the month and two spans of the steel bridge over the structure were erected. A class 14 electric Bucyrus drag line continued excavation of the Willwood Canal rock cut below C-J Coulee on a three-shift basis.

On the Garland and Frannie divisions drainage work was continued, an Austin trencher, two class 9½ Bucyrus drag lines, and a No. 206 P. & H. drag line working on the Garland division and a class 14 Bucyrus, two class 9½ electric Bucyrus, and a No. 206 P. & H. drag line working on the Frannie division. One thousand one hundred and nineteen linear feet of the Deaver Canal were lined with gunite, but work was seriously hindered by rains.

The canal systems of the Garland and Frannie divisions were operated without interruption. The storm of the 22d washed out a few minor structures and disarranged deliveries, but the damage to the system was comparatively light. Deliveries were heavy until the 22d, but rains then and since and the putting up of alfalfa hay decreased the demand after that date. Crops in general were looking well. The first cutting of alfalfa was 50 per cent done on the Garland division and 90 per cent done on the Frannie division at the close of the month.

The power system was closed down eight hours each on the Sundays of June 3 and 10 to permit the inspection of the high tension transmission line. One hundred and ten thousand six hundred kilowatt hours were delivered to Government power users and 12,162 kilowatt hours to commercial connections. Service connection for the town of Cowley was made June 1.—*J. S. Longwell.*

INDIAN PROJECT, MONTANA.

BLACKFEET PROJECT.

June weather was rather cold, but precipitation was considerably above normal, so that conditions were fairly favorable for crop growth, although somewhat unfavorable for construction and operation and maintenance work.

Construction work was confined to completing a timber check in Four Horns Reservoir outlet canal.

Two Medicine, Badger-Fisher, and Birch Creek divisions were operated at small capacity, a total of only 832 acres being irrigated.

Maintenance work consisted of making minor repairs to canals and laterals and removing silt from the upper end of Fisher Canal.—*R. M. Snell.*

FLATHAD PROJECT.

Weather conditions were excellent for crops, with a precipitation of 3.45 inches, which is 1.22 inches above the average for June. Precipitation occurred on 15 days of the month and seriously interfered with construction work.

At the Hubbard Dam 543 cubic yards of stripping and 410 cubic yards of rock excavation were done; 466 cubic yards of concrete were placed, bringing the dam up to elevation 3,140. A hoisting tower 105 feet in height was erected and the trestle to be used in

placing concrete was brought up to elevation 3,155. Five grout holes were drilled and 33 holes were grouted under 80 pounds pressure.

On the Tabor feed canal the steam shovel completed the canal to station 225+70 and excavated 16,690 cubic yards during the month. Clearing of right of way amounted to 4.4 acres and was completed to station 235. The screening plant was put into operation and 86 cubic yards of concrete placed in the Falls Creek structure. Leveling of the canal bank for roadway was continued.

On the Ninepipe Dam 19,500 cubic yards of embankment were placed and 616 cubic yards of stripping done. On the Pablo feeder canal enlargement the entire month was required to advance the drag line to the beginning of the enlargement work near Post Creek. One particularly high side hill cut was shot down by means of black powder. Clearing of right of way and clearing of brush and bushes from the ditch bank was in progress with a small force.

Contractors on lateral excavation moved 9,200 cubic yards of material and Government forces moved 4,500 cubic yards; 642 linear feet of lock-joint pipe were manufactured and 436 linear feet placed in the Pablo 70.1 A siphon. Two steel flumes and 43 other minor structures were placed on laterals.

The use of water was small on account of the precipitation; 3,800 acre-feet of water were delivered for the irrigation of about 5,000 acres of land. The *Ruth* dredger cleaned 2½ miles of laterals and excavated 3½ miles of drains; 9,212 cubic yards of material were excavated. A cloudburst on the 7th broke the Camas A Canal and filled it in several places with wash from the hills.

The first cutting of alfalfa began about the middle of the month, with a good yield.—*C. J. Moody.*

FORT PECK PROJECT.

Precipitation for June was 4.69 inches, which is 1.9 inches above normal for the month.

Operating forces delivered 1,027.7 acre-feet of water to irrigate 896 acres of land, making a total to date of 1,813.57 acre feet and 1,647 acres of land. To date 85 farm turnouts and 129 miles of canals and laterals have been operated.

Maintenance work consisted of minor repairs to canals and structures, including the raising of bank of about 2 miles of fill on the Big Porcupine division to increase capacity of lateral.

All garden and field crops made substantial growth. Corn was exceptionally good, and some excellent results were obtained in new seedings of alfalfa. Some damage was reported from hail, and grasshoppers were doing damage in some sections. The first cutting of alfalfa was being harvested. Meadows and ranges were in excellent shape and all live stock were in very good condition.—*E. L. Decker.*

GENERAL OFFICES.

Washington office.—Changes in the Washington office of the Bureau of Reclamation were effected on June 18, when the Secretary abolished the office of director, effective June 30. In its place he created the position of commissioner and appointed to the position David W. Davis, former Special Assistant Secretary of the Interior, who assumed his new duties on June 20.

Assistant Director Morris Bien was appointed assistant commissioner. Mr. Bien was in the office the entire month, as was also Chief Counsel Hamele.

Chief Engineer Weymouth and Assistant Chief Engineer Williams arrived in Washington on June 28 to confer with the commissioner on various matters.

During the latter part of the month orders were received from the Secretary's office consolidating the work of the purchase and supplies section, including all purchasing by the Washington office, the handling of supplies, distribution of publications, and mimeographing, but excluding printing, with similar work in the Secretary's office.

Purchases during the month amounted to \$10,613.11, and for the six-month period to \$41,832.84. The value of the 283 requisitions filled and sales from the storehouse amounted to \$3,734.98, and for the six-month period to \$22,732.91.

Publications issued comprised 54 copies of the annual report and 80 miscellaneous publications. The numbers issued for the six-month period were 475 and 2,067, respectively. The 25 mimeograph jobs amounted to a total run during the month of 14,780 sheets, and to 100,925 sheets for the six-month period.

The number of inquiries concerning the bureau and opportunities for settlement answered by the settle-

ment and information section amounted to 446 and to a total of 3,233 for the six-month period. At the close of the month the total number of inquiries from ex-service men concerning opportunities on the land amounted to 199,711.

The photographic laboratory turned out work during the month to the value of \$167, distributed as follows: Washington office, \$78.10; field, \$5.80; sales, \$83.10. The value of the work for the six-month period amounted to \$1,564.28. During the month the laboratory received an order from the Consular Service of the State Department for 500 enlargements, 20 by 24 inches in size, of five national park photographs. Consideration will be given to the desirability of placing similar enlargements of irrigation-project scenes in the consular offices in specified countries, with a view to attracting desirable settlers to the projects. A large number of negatives have been received from Statistician Blanchard and Photographer Dane, covering their trip over the Columbia Basin and on the Yakima project, prints from which were being made in the laboratory.

Comparison between operation and maintenance estimates and results, January 1 to June 30, 1923.

Project	Gross cost.				Net accruals and revenues.				Area paying charges.
	Estimate for 1923.		Actual cost to June 30.	Amount * over or under estimate.	Estimate for 1923.		Actual returns to June 30.	Amount more or * less than estimate.	
	Total for year.	To June 30.			Total for year.	To June 30.			
UNDER PUBLIC NOTICE.									
Belle Fourche.....	\$70,000	\$35,000	\$29,498	\$5,502	\$72,000	\$1,651	\$2,386	\$735	Acres.
Boise.....	290,000	147,000	129,060	17,940	241,492	109,000	89,000	* 20,000	72,448
Carlsbad.....	40,000	22,500	21,200	1,300	55,550	29,000	29,475	475	161,500
Huntley.....	41,000	20,000	19,803	197	42,000	10,000	5,600	* 4,400	25,000
King Hill.....	33,515	17,000	13,197	3,803	133,515	24,861	24,791	* 70	21,800
Klamath (Tule Lake).....	12,400	4,000	1,565	2,435	112,443	5,960	4,000	* 1,960	10,000
Klamath (main).....	55,000	29,060	33,117	* 4,057	155,647	26,400	29,000	2,600	9,920
Lower Yellowstone.....	40,000	23,000	17,000	6,000	130,741	25,000	18,695	* 6,305	42,105
Minidoka (south side).....	94,000	47,034	38,188	8,846	99,300	27,450	25,500	* 1,950	46,000
Newlands.....	111,400	61,133	75,316	* 14,183	114,000	49,820	47,980	* 1,840	48,000
North Dakota pumping.....	32,900	15,600	18,383	* 2,783	102,167	(2)	(2)	(2)	67,741
North Platte (interstate).....	175,000	85,000	80,500	4,500	151,000	40,000	40,000	.....	7,653
North Platte (Northport).....	24,000	9,800	4,800	5,000	124,000	4,800	4,800	.....	110,000
Okanogan.....	52,200	20,905	22,800	* 1,895	154,100	22,780	22,685	* 95	15,000
Orland.....	33,000	19,100	18,300	800	33,618	15,900	15,900	.....	6,918
Rio Grande.....	222,000	115,100	101,500	13,600	1250,000	101,500	101,500	.....	20,174
Shoshone.....	66,000	29,750	29,093	657	66,000	24,200	19,000	* 5,200	140,500
Strawberry Valley.....	* 25,000	11,800	11,000	900	49,200	12,000	15,000	3,000	58,700
Sun River (Fort Shaw).....	11,100	6,300	6,916	* 616	11,500	4,750	4,750	.....	46,846
Uncompahgre.....	135,000	(2)	(2)	(2)	144,500	(2)	(2)	(2)	10,100
Umatilla.....	37,225	19,700	20,000	* 300	137,225	17,360	18,000	640	90,000
Yakima (Sunnyside).....	145,000	76,500	66,564	9,936	150,767	72,000	73,000	1,000	24,592
Yakima (Tieton).....	96,000	48,000	50,300	* 2,300	89,500	32,060	33,500	1,440	97,205
Yuma.....	290,000	165,000	171,000	* 6,000	292,500	148,000	159,000	11,000	32,000
Yuma auxiliary.....	57,600	26,500	26,940	* 440	60,000	23,000	23,200	200	63,200
Total.....	2,189,340	1,054,782	1,006,040	48,742	2,272,765	827,492	806,762	* 20,730	1,231,102
UNDER WATER RENTAL.									
Grand Valley.....	50,000	27,500	21,000	6,500	51,300	22,000	22,000	.....	20,000
Milk River (Including St. Mary).....	69,000	34,289	28,111	6,178	18,600	10,255	10,570	315	45,170
North Platte (Fort Laramie).....	90,000	47,000	33,000	14,000	190,000	33,000	33,000	.....	46,000
Sun River (Greenfields).....	22,000	10,000	8,790	1,210	22,100	4,000	.....	* 4,000	18,000
Total.....	231,000	118,789	90,901	27,888	182,000	69,255	65,570	* 3,685	129,170
INDIAN.									
Blackfeet.....	30,000	14,000	12,193	1,807	16,400	6,000	1,236	4,764	20,900
Flathead.....	55,000	28,400	24,882	3,518	54,500	13,000	4,600	* 8,400	35,000
Fort Peck.....	15,450	8,200	5,927	2,273	1,100	800	1,647	847	1,100
Total.....	100,450	50,600	43,002	7,598	72,000	19,800	7,483	* 12,317	57,000

¹ Returns regulated by district contracts.

² Not received in time for publication.

³ Not including tunnel repairs.

⁴ Includes installment of \$25,000 for tunnel repairs.

During the month a number of the bureaus of the department arranged an exhibit of their activities in the main corridor of the Interior Department Building. The Bureau of Reclamation was represented by a number of transparencies and enlarged photographs, both colored and in sepia.

At the close of the month 1,067 applications under the leniency act had been received at the Washington office, of which 5 had been approved by the Washington office, 1 by the Secretary's office, and 37 denied.

Visitors to the Washington office included District Counsel Stoutemyer, R. E. Shepherd, W. G. Swendsen, State reclamation commissioner of Idaho, and W. O. Creer, manager of the Empire irrigation district, all in connection with the American Falls development; J. H. Evans, of Las Cruces, N. Mex.; State Engineer J. A. Franch, of New Mexico; Mr. Armstrong, of Rawlins, Wyo.; State Highway Engineer Z. E. Severson, of Wyoming; and W. S. Cone, former engineer on the Salt River project, Arizona.

Denver office.—The chief engineer was in the Washington office at the beginning of June, returned to the Denver office on June 18, and left Denver for Washington again on the 25th. Asst. Chief Engineer Charles P. Williams also left Denver on June 25 for Washington. Asst. Chief Engineer R. F. Walter returned to the Denver office from a visit to the Salt Lake Basin investigations on June 11. He left again on June 20 for a visit to the Yampa and White River investigations, returning on June 25. Engineer James Munn and Designing Engineer J. L. Savage were in the field at the beginning of the month and during June visited the Salt Lake Basin investigations, Klamath, Umatilla Rapids, Yakima, and Boise projects, returning to Denver on June 21. Electrical Engineer James M. Gaylord was on the Yuma project at the beginning of June and during the month also visited the Salt River and Rio Grande projects, returning to Denver on June 15.

The principal work in the designing section consisted of the following: Prepared detail designs for concrete check for Four Horns Reservoir outlet canal, Black-foot project; prepared design for individual drive motor-operated radial gate hoist for canal headgates, Boise project, Black Canyon Dam; prepared new preliminary design for variable arched dam at Gerber site; made studies of theory of arched dams, with special reference to stresses in the proposed Gerber Dam; completed detailed design for outlet works, Gerber Dam; prepared designs and estimates for 30-inch lock-joint pipe siphon on the Dry Lake pumping line, Klamath project; partially prepared detail designs and estimates, with detail specifications for the construction by contract of monolithic concrete pipe siphon at station 5685, Fort Laramie Canal; partially prepared detail design for monolithic concrete pipe siphon at stations 6065, 6228, 6327, 6351, 6458, 6531, 6538, and 6612, Fort Laramie Canal, North Platte project; practically completed detail designs for turnout and wasteway to Pilot Butte Reservoir, Wyoming Canal, station 488; prepared detail specifications for structures for construction by Government forces on Wyoming Canal and Pilot Butte Reservoir; partially completed detail designs for diversion structure in Pilot Canal, below dam; prepared design for power-operating equipment for outlet gates, Pilot Butte Dam; prepared design for 3 by 3 foot cast-iron sand gate for Pilot Butte power plant; prepared design for 6 by 3 foot cast-iron ice gate, Pilot Butte power plant; prepared design for 16:1 individual drive, motor-operated gate hoist for Pilot Butte

power plant, Riverton project; prepared eight sketch designs and estimates for different types of construction for C-J Coulee flume, Willwood Canal, Shoshone project; prepared preliminary design and estimate for Pishkun Dam, Sun River project; prepared preliminary designs and studies for spillways, McKay Dam; completed draft of specifications for construction of McKay Dam by Government forces; prepared detail drawings for outlet works, McKay Dam.

The principal work in the electrical section consisted of the following: Steel pipe manifolds for the penstocks and delivery pipe, Black Canyon pumping plant, were designed and specifications were prepared and issued, Boise project. The design of the penstock tunnel from the needle valve branch to the present tunnel portal was completed; design for reconstruction of the manifold at the Lahontan power plant was completed; installation plans and control piping for the 60-inch needle valve were completed; also design of the house for this valve, Newlands project. Drawings and specifications for repair parts for the Ensign valves and sliding gates in the North Tunnel, Pathfinder Dam, were completed and issued; designs were prepared for adapting metal forms for concrete lining of crooked discharge tubes in the South Tunnel, Pathfinder Dam, North Platte project. The steel manifold for the Pilot Butte power plant was designed and specifications for its purchase were issued; conduit layout for the Pilot Butte power plant was made; cast-iron elbow for the synchronous by-pass valve was designed; design of the concrete pressure pipe was begun; final design of the Pilot Butte power plant was begun, Riverton project. Proposed layout of power circuits and equipment for the construction plant, McKay Dam, as submitted by the construction engineer were revised and requisition issued for purchase of necessary wire and equipment; arrangements were made with the Bucyrus Co. to furnish the manganese steel Vanderhoef dippers with the 80-B electric shovels being furnished for this construction plant, Umatilla project. Design of the 30-inch Y branch and connections to the 24-inch needle valve was checked and corrected, Yakima storage. The shut-off valve installation on the by-pass piping in Hubbard Dam and the means for protecting the needle valves against freezing were designed and detail drawings partly completed, Flathead project. Preliminary studies of power development at Boulder Canyon Dam were taken up, Colorado River.

Among the more important matters which received consideration in the legal section were: Opening to entry of certain lands within Paradise Valley irrigation district, Milk River project; right of way for transmission lines over Shoshone Indian Reservation from Pilot Butte plant, Riverton project; rental of water to Harlem Irrigation District for the season of 1923, Milk River project; furnishing of water to Yuma-Mesa Grapefruit Syndicate, Mesa division, Yuma project; condemnation proceedings, McKay Reservoir site, Umatilla project. The more important forms of contracts considered, prepared, or transmitted were: Supplemental contract with State of Utah for continuation of investigations in the Salt Lake Basin; contract with State of Idaho for payment for distribution of stored water and natural flow of Snake River; contract with Great Falls Power Co. for purchase of electrical energy from the company, Sun River project; proposed contract with Oregon Short Line Railroad Co., relating to protection of tracks of company from backwater of Black Canyon dam, Boise project; proposed contract with Midvale Irrigation District, Riverton project.

ADMINISTRATIVE ORGANIZATION.

DEPARTMENT OF THE INTERIOR.

Hon. HUBERT WORK, Secretary of the Interior.
 EDWARD C. FINNEY, First Assistant Secretary.
 FRANCIS M. GOODWIN, Assistant Secretary.
 JOHN H. EDWARDS, Solicitor for the Interior Department.
 EBERT K. BURLEW, Administrative Assistant to the Secretary.
 JOHN H. MCNEELY, Assistant to the Secretary.
 JOHN HARVEY, Chief Clerk and Superintendent of Buildings.

BUREAU OF RECLAMATION.

WASHINGTON, D. C.

David W. Davis, commissioner; Miles Cannon, field reclamation commissioner; Morris Bien, assistant commissioner; Ottamar Hamels, chief counsel; J. B. Beadle, commissioner's assistant; C. J. Blanchard, statistician; Hugh A. Brown, editor and office assistant; C. A. Bissell, engineer; J. M. Luney, chief accountant; C. A. Lyman, repayment accounting; Miss H. A. Fellows and Raymond Depue, fiscal agents; C. H. Fitch, chief clerk; G. W. Numbers, appointment clerk; H. N. Bickel, Yakima, Wash., and W. F. Kubach, Denver, Colo., examiners of accounts.

DENVER, COLO.

F. E. Weymouth, chief engineer, Wilda Building, Denver, Colo.
 R. F. Walter and C. P. Williams, assistant chief engineers; Miss L. H. Meisel, secretary to the chief engineer; J. M. Gaylord, electrical engineer; J. L. Savage, designing engineer; James Munn, engineer; W. A. Meyer, chief clerk; A. McD. Brooks, purchasing agent; Harry Caden, fiscal agent.

PROJECT ORGANIZATION.

Belle Fourche Project.—B. E. Hayden, project manager, Newell, S. Dak.; R. C. Walber, chief clerk.

Boise Project.—J. B. Bond, project manager, Boise Idaho; Walter Ward, engineer in charge construction Black Canyon Dam; E. R. Mills, chief clerk; C. F. Weinkauff, fiscal agent.

Carlsbad Project.—L. E. Foster, project manager, Carlsbad, N. Mex.; V. L. Minter, chief clerk and fiscal agent.

Grand Valley Project.—S. O. Harper, project manager, Grand Junction, Colo.; W. J. Chiesman, chief clerk; A. H. Hall, fiscal agent.

Huntley Project.—A. R. McGinness, project manager, Ballantine, Mont.; H. S. Elliott, chief clerk; Miss M. C. Simek, fiscal agent.

King Hill Project.—A. M. Rawn, project manager, King Hill, Idaho; T. W. Hause, chief clerk; W. S. Gillogly, fiscal agent.

Klamath Project.—H. D. Newell, project manager, Klamath Falls, Oreg.; N. G. Wheeler, chief clerk; G. R. Barnhart, fiscal agent.

Lower Yellowstone Project.—H. A. Parker, project manager, Savage, Mont.; E. R. Scheppelmann, chief clerk.

Milk River Project.—G. E. Stratton, project manager, Malta, Mont.; E. E. Chabot, chief clerk; G. S. Moore, fiscal agent.

Minidoka Project.—Barry Dibble, project manager, Burley, Idaho; Dana Templin, engineer; E. C. Diehl, chief clerk; Miss A. J. Larson, fiscal agent; F. A. Banks, engineer, American Falls, Idaho.

Newlands Project.—J. F. Richardson, project manager, Fallon, Nev.; A. W. Walker, engineer; G. B. Snow, chief clerk; Miss Ethel M. Simmonds, fiscal agent.

North Dakota Pumping Project.—W. S. Arthur, project manager and chief clerk, Williston, N. Dak.; H. C. Melas, fiscal agent.

North Platte Project.—Andrew Weiss, project manager, Mitchell, Nebr.; H. W. Bashore, engineer, Fort Laramie Division; T. W. Parry, irrigation manager; J. R. Ummel, chief clerk; Mrs. A. L. Truax, fiscal agent.

Okanogan Project.—Calvin Casteel, project manager, Okanogan, Wash.; W. D. Funk, chief clerk and fiscal agent.

Orland Project.—R. C. E. Welser, project manager, Orland, Calif. E. T. Eriksen, engineer; C. H. Lillingston, chief clerk and fiscal agent.

Rio Grande Project.—L. M. Lawson, project manager, El Paso, Tex.; C. A. Peavey, chief clerk; L. S. Kennicott, fiscal agent.

Riverton Project.—H. D. Comstock, project manager, Riverton, Wyo.; L. H. Mitchell, engineer; R. B. Smith, chief clerk; W. J. Fogarty, fiscal agent.

St. Mary Storage Division.—R. M. Snell, project manager, Brown- ing, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Salt River Project.—Being operated by the Salt River-Valley Water Users' Association; C. C. Cragin, general superintendent and chief engineer, Phoenix, Ariz.

Shoshone Project.—J. S. Longwell, project manager, Powell, Wyo.; J. R. Isakisch, engineer; C. M. Jump, superintendent of irrigation; W. F. Sha, chief clerk; Miss L. C. Drinkwater, fiscal agent.

Strawberry Valley Project.—W. L. Whittmore, project manager, Provo, Utah; H. R. Pasewalk, chief clerk; W. C. Berger, fiscal agent.

Sun River Project.—G. O. Sanford, project manager, Great Falls, Mont.; H. W. Johnson, chief clerk; F. C. Lewis, fiscal agent; G. A. Benjamin, irrigation manager, Fairfield, Mont.

Umatilla Project.—H. M. Schilling, project manager, Hermiston, Oreg.; R. M. Conner, engineer in charge construction McKay Dam; G. C. Patterson, chief clerk and fiscal agent.

Uncompahgre Project.—L. J. Foster, project manager, Montrose, Colo.; G. H. Bolt, chief clerk; F. D. Helm, fiscal agent.

Yakima Project.—J. L. Lytel, project manager, Yakima, Wash.; R. K. Cunningham, chief clerk; J. C. Gawler, fiscal agent; M. D. Scroggs, superintendent of irrigation, Sunnyside, Wash.; J. S. Moore, superintendent of irrigation, Route 6, Yakima, Wash.; F. T. Crowe, engineer in charge construction Tieton Dam, Rimrock, Wash.; C. F. Gleason and W. C. Christopher, engineers; V. G. Evans, chief clerk; E. V. Hillius, fiscal agent.

Yuma Project.—P. J. Preston, project manager, Yuma, Ark.; R. M. Priest, superintendent of construction; D. C. McConaughy, engineer, Yuma Mesa Division; D. C. Caylor, superintendent of irrigation; C. A. Denman, chief clerk; E. M. Philebaum, fiscal agent.

INDIAN PROJECTS.

Blackfeet Project.—R. M. Snell, project manager, Browning, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Flathead Project.—C. J. Moody, project manager, St. Ignatius, Mont.; S. A. Kerr, engineer in charge construction Hubbard Dam; J. M. Swan, chief clerk; J. P. Siebeneicher, fiscal agent.

Fort Peck Project.—E. L. Decker, acting project manager, Poplar, Mont.; Henry Berryhill, chief clerk and fiscal agent.

FIELD LEGAL OFFICES.

Boise, Idaho.—B. E. Stoutemyer, district counsel. Projects: Boise, Minidoka, King Hill, and Jackson Lake Enlargement.

Denver, Colo.—Law section office of chief engineer: R. M. Patrick and Armand Offutt, district counsel.

Las Cruces, N. Mex.—Mark B. Thompson, attorney. Projects: Rio Grande, Carlsbad, and Hondo.

Helena, Mont.—E. E. Roddis, district counsel, Helena, Mont. Projects: Blackfeet, Flathead, Fort Peck, Huntley, Milk River, St. Mary Storage, Sun River, North Dakota Pumping, Lower Yellowstone, and Shoshone.

Mitchell, Nebr.—J. N. Beardslee, district counsel. Projects: North Platte, Belle Fourche, and Riverton.

Montrose, Colo.—J. R. Alexander, district counsel. Projects: Grand Valley, Uncompahgre, and Strawberry Valley.

Portland, Oreg.—H. L. Holgate and D. G. Tyree, district counsel, Post Office Building. Projects: Yakima, Okanogan, Umatilla, Klamath, and Baker.

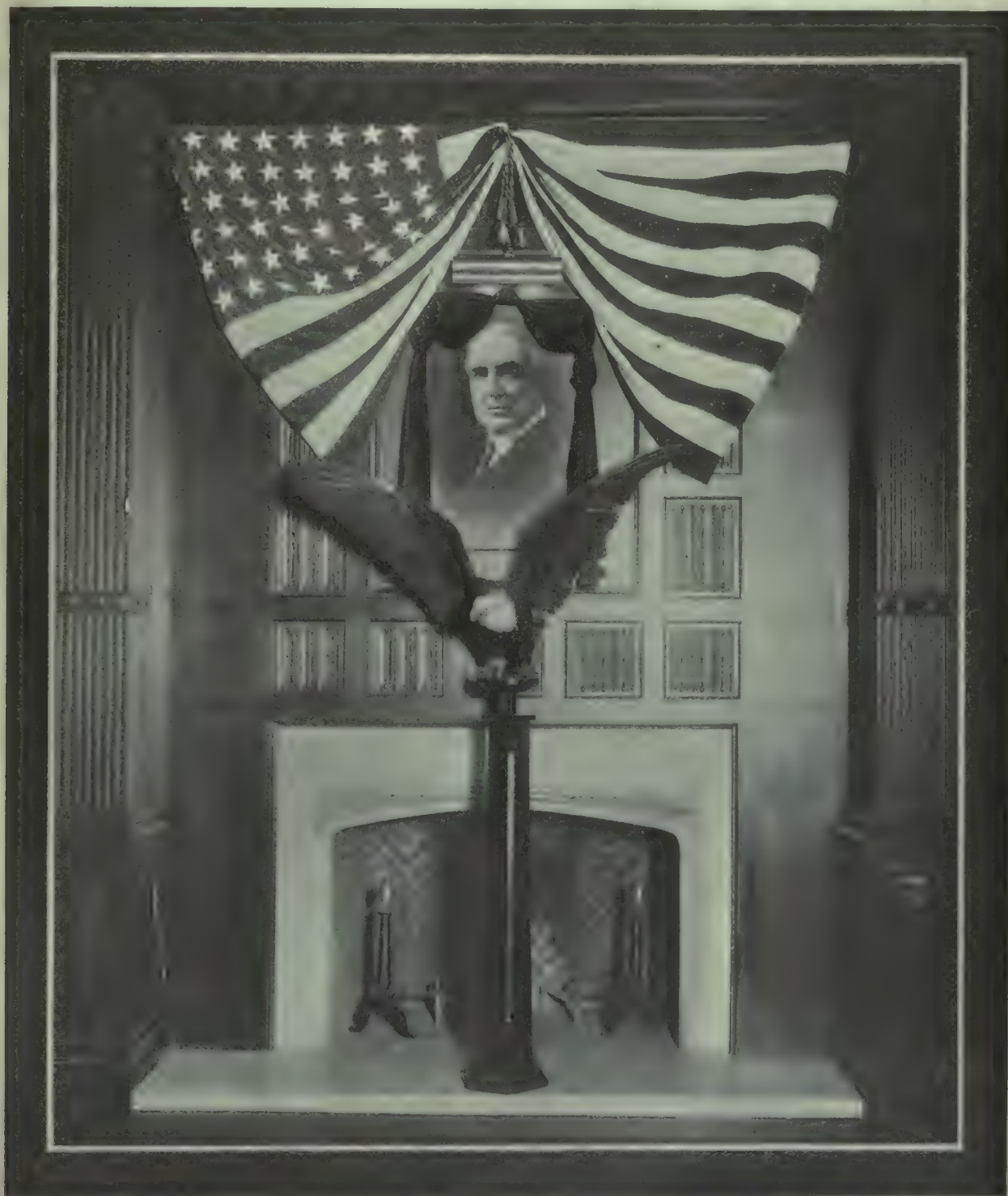
San Francisco, Calif.—P. W. Dent and Brooks Fullerton, district counsel, 349 Pacific Building. Projects: Salt River, Yuma, Orland, and Newlands.

The Reclamation Record

Vol. 14

AUGUST, 1923

No. 8



The draped portrait of the late President Harding in the office of the Secretary of the Interior at the National Capitol.

TABLE OF CONTENTS

	Page.
<i>President Harding—A memory</i>	265
<i>Tentative policy of the Reclamation Bureau</i>	266
<i>Electric development on Minidoka project succeeds</i>	267
<i>Service relations</i>	268
<i>"Culling" of poultry flock is important problem</i>	269
<i>Complaint department</i>	270
<i>Efficiency, keynote</i>	270
<i>\$45,000 is saved</i>	270
<i>Reclamation project women and their interests</i>	271
<i>Cheese factories win</i>	272
<i>Alfalfa popular with western farmers</i>	272
<i>What the courts are saying</i>	273
<i>Thanks, Sunnyside</i>	273
<i>Smokers, take notice</i>	274
<i>Comparison between operation and maintenance estimates and results, January 1 to July 31, 1923</i>	274
<i>Another big saving</i>	275
<i>Crop prices, July, 1923</i>	275
<i>Monthly conditions of principal Bureau of Reclamation reservoirs for July, 1923</i>	275
<i>American Falls dam</i>	276
<i>Watch your hogs</i>	276
<i>Please page Noah</i>	276
<i>Administrative organization</i>	276

THE RECLAMATION RECORD is sent, without direct charge, to the water users on the irrigation projects of the Bureau of Reclamation. To other than water users the price is 75 cents per year, payable in advance. Subscriptions should be sent to the Chief Clerk, Bureau of Reclamation, Washington, D. C., and remittances (postal money order or New York draft) should be made payable to the Special Fiscal Agent, Bureau of Reclamation. Postage stamps will not be accepted.

President Harding—A Memory

Rich in human sympathy, friendship, statesmanship, and an awakened national conscience.

No one has rekindled the spirit of the new commandment as did this man.

"Try to determine what is the right thing and do that," was a reply grown familiar to some of us, when questions of administration, having human relations, were being discussed. The rule of life in a brief sentence; likewise the mandate of a just man and a President of all the people.

His often expressed hope "If I can leave this Republic stronger and its people more prosperous when my term expires, I shall be content" had already been realized.

President Harding--now a memory to be blended with prayers from the pulpit and the bedside; to be recounted by mothers to sons for a generation. Not a hero of battles, but a Prince of Peace among men. A ruler whose life was worn away in unremitting service to his people.

His mantle has fallen on stable shoulders, and to his countrymen he left a good name.

Let everyone in our Department stand firm in his place. The Republic must go on. He would wish it so.

The Secretary of the Interior.

TENTATIVE POLICY OF THE RECLAMATION BUREAU

EXISTING PROJECTS.

REDUCE overhead costs.

Deal with projects and water users as an engineering and business problem.

Encourage subdivision of large holdings into small farms, when better farming will follow.

Encourage and assist farmers to diversify and rotate their crops.

Aid in securing creameries, sugar factories, and other industries within or near the project limits to the end that a ready and profitable market for the products of the farms may at all times exist and be available.

Cooperate with the farmers in the packing, handling, shipping, and marketing of their products to the end always that the maximum of return with the minimum of expense may come to the farmers.

Impress on water users the idea that the Government money advanced for the construction of these projects was temporarily for their benefit in the nature of a loan without interest.

NEW PROJECTS.

THE West demands and should have additional reclamation projects where and when feasible.

Recommend against any new project where the cost is so high that there is no reasonable probability of farmers being

able to repay construction costs. Such action will advance and not retard meritorious reclamation projects.

Recommend against any new project where the probable cost of operation and maintenance, through pumping or otherwise, will be too heavy a burden for the water users to carry annually.

Make not only engineering studies of proposed projects, but studies of soil, climate, and markets, including kinds of fruits, grains, or other crops which the soil and climate will permit to be grown profitably.

In brief, establish a real, actual, and helpful working cooperation with the farmer to aid him in every phase and aspect of production and marketing of crops.

Make careful study of probable annual cost of operating and maintaining a project when built, including cost of drainage systems.

If the project is undertaken see to it that cost of construction is accurately calculated, so that when the work is completed an unexpected and unestimated burden does not rest upon the water users because of underestimated construction cost.

It would appear that all Government irrigation projects should be put under the control of the water users at the earliest possible moment.

HUBERT WORK,
Secretary of the Interior.

THE RECLAMATION RECORD

Issued monthly by the Department of the Interior, Bureau of Reclamation, Washington, D. C.

HUBERT WORK
Secretary of the Interior

DAVID W. DAVIS
Commissioner, Bureau of Reclamation

Vol. 14

AUGUST, 1923

No. 8

ELECTRIC DEVELOPMENT ON MINIDOKA PROJECT SUCCEEDS.

Power for pumping of water utilized for making electricity and thriving towns are furnished with electric lights for both domestic and commercial consumption.

ON the Minidoka project in Idaho the Bureau of Reclamation has a power development which was installed primarily for the purpose of pumping water for irrigation. In the summer about 90 per cent of the total capacity of 7,800 kilowatts is used in this way. The remainder is used

and other fixed charges, and in addition is earning approximately 6 per cent on the investment. Government participation in the handling of the electricity is limited as closely as possible to its generation, transmission, and transformation from 33,000 to 2,200 volts. The communities, both town

and rural, take the electricity from the several substations at 2,200 volts and distribute it to the consumers.

of the business is very profitable. In 1910 the city of Burley, then a village of less than 400 people, entered into a contract with the Bureau of Reclamation and issued bonds for the construction of the pole lines for distributing the electricity. In all, bonds to the amount of \$37,000 have been issued and a considerable part of these have been redeemed. At the end of 1922 the city—now grown to a population of 5,500—had an investment in the system amounting to over \$126,000, all of which—except that covered by outstanding bonds—has been paid for from the earnings of the system. Burley's peak load is 2,500 kilowatts. In 1922 the net profits of the city, after paying all expense for operation and maintenance and the interest on its outstanding bonds, amounted to over \$23,000, most of which is invested in the warrants of other city departments. The following figures are taken from the city's books:

City of Burley, Idaho—Electric department; annual earnings and expenses, 1922.

Revenue from sale of electricity	\$86,477.05
Expenses:	
Electricity purchased from	
United States	\$52,045.13
Operation	8,287.41
Maintenance	1,227.23
Interest on bonds	1,589.00
Total	63,148.77
Surplus earnings Jan. 1 to Dec. 31, 1922.	23,328.58



Power house and dam, Minidoka project, Idaho.

for supplying the summer needs of several thriving towns and the farming community making up the Minidoka project. Seventy-five per cent of the farm homes on this tract of 121,000 acres have electric service. In the winter the pumping plants are shut down and the entire power supply is available for sale. The normal winter increase in the use of electricity for domestic and commercial purposes is not anywhere near sufficient to absorb the power that is released by the pumping plants. Beet-sugar factories and alfalfa-meal mills on the project need a small part of the surplus, but electric heating of houses and other buildings has become the largest use to which the plant capacity and the energy that would otherwise be wasted are being put.

The Bureau of Reclamation in supplying electricity to the Minidoka project is charging to this feature a proper share of the operation and maintenance expense, depreciation,

and rural, take the electricity from the several substations at 2,200 volts and distribute it to the consumers.

DISTRIBUTING COMPANIES PROSPER.

The distributing companies, and particularly the towns, have found that their end



Pumping station on the Minidoka project, Idaho.



Interior of power house, from switchboard gallery, Minidoka project, Idaho.

In former years, as shown in the accompanying table, the surplus earnings were also good and the money needed was used for construction as the town grew.

Year.	Surplus earnings.	New construction.	Cost of system to Dec. 31.
1918.....	\$17,441.35	\$17,167.22	\$91,328.10
1919.....	26,735.06	9,021.89	100,349.90
1920.....	35,919.06	17,618.27	117,968.17
1921.....	24,905.10	6,310.17	124,278.34
1922.....	23,328.58	1,799.10	126,077.44
5 years....	128,329.15	51,916.65	.....

In 1920 the city of Rupert (population 2,500) entered into a contract with the United States and purchased the electric system in that town. The system had formerly been operated by a private corporation. Bonds to the amount of \$60,000 were issued to make the purchase and to remodel the system. In 1921, after allowing for interest on the bonds and for depreciation, as well as taking care of all other expenses, the earnings showed a net profit to the city of nearly \$10,000. In 1922 this was increased to over \$13,000, or 21 per cent on the investment in addition to 6 per cent interest paid on the bonds. The Rupert books tell this story, as shown in the accompanying table.

In 1921, not having sufficient electricity to meet the summer requirements of the project the Bureau of Reclamation arranged with the Idaho Power Co. to transmit power generated in the bureau power house on the Boise River in the Boise project to the Minidoka project, a distance of 200 miles. Additional power is required to pump water onto lands now dry. This will be supplied by generating stations at American Falls and at

other power sites which will feed into the transmission system.

City of Rupert, Idaho, electric department.

	1921	1922
Expenses:		
Electricity purchased for light and power.....	\$13,818.81	\$13,653.62
Electricity purchased for heating.....	11,186.88	12,241.25
Operation and maintenance.....	4,654.17	2,769.64
Office expense, etc.....	5,145.49	3,723.58
Interest on bonds (6 per cent).....	3,600.00	3,600.00
Depreciation reserve fund.....	4,500.00	2,020.47
Total.....	42,905.35	38,008.56
Revenue from sale of electricity.....	52,784.92	51,069.63
Surplus earnings.....	9,879.57	13,061.07

In handling the work on the Minidoka project the Bureau of Reclamation has attempted to stay out of the retail business for which it as a governmental organization is not well adapted. It has recognized that there is an analogy between the electric business and other lines of business. The generating of electricity compares with the manufacturing or producing of other products. The transmission lines, in collecting electricity from various sources and in disposing of it in large quantities through substations, can be compared to the jobbing or wholesale houses, while the distribution systems between the substation and the consumer represent a business similar to that conducted by the retailer. In this case the bureau has assumed the responsibility for the generating stations, transmission lines, and substations, thus including all the high-

tension apparatus. The communities, on the other hand, have taken over the distribution or retail end with all its multiplicity of detail and small accounts. The plan has proven a great success to all parties.

SERVICE RELATIONS.

ON JUNE 14, 1923, Hubert Work, Secretary of the Interior, addressed a personal letter to each of the 25 managers of operating reclamation projects, urging the establishment of closer relations between the reclamation workers and the water users. At this writing (August 15, 1923) only five project managers have made an acknowledgment to the Secretary of the Interior. The letter from Secretary Work to the project managers follows:

"You are this department's representative, on the ground, connecting the department in Washington with those for whom reclamation was devised.

"When in your office, or on duty, make yourself available for consultation with the settler, soon to be part owner, with the least possible delay.

"Bring about the closest possible relation between your office and the water users, working together with them in their interests first, so that the Government may be protected finally, and for the mutual interests of all.

"In case of serious complaint, you should study the case carefully before arriving at a decision. Put yourself in the complainant's place; avoid an arbitrary attitude on any question brought up by the water users. No complaint is unimportant; it is only relatively so. You should hear each case, give it careful consideration, and decide it upon its merits. No better compliment can be paid you, as project manager, than to have it said that you are fair and are willing to hear a matter before rendering your decision. There are times, of course, when questions of local policy may be discussed with the directors of districts or associations with profit to both, thus greatly enhancing the relations between water users' organizations and project employees.

"Call conferences; sympathetic discussions will help you as much as anyone. The success of these projects depends on the success of the settler living thereon. You should have a sympathetic understanding of the difficulties of the farmer. You will not, however, be swayed from direct adherence to the law and regulations relative to the project, but these should be carried out with diplomatic determination, even though you face temporary unpopularity.

"I hope our managers, who have been construction engineers, may try to distinguish

(Continued on page 269.)

"CULLING" OF POULTRY FLOCK IS IMPORTANT PROBLEM.

Farmers should put all cockerels on the market that they do not intend to use for breeding purposes in order to avert losses through holding and fattening them.

By H. O. Numbers, Secretary Pennsylvania State Poultry Association.

YOUR profits this year will depend upon how well you "cull" your flock. At this time of the season all your cull cockerels should be on the market. It is unwise to hold over any male birds that you do not intend to use in the breeding pens. The writer has had a lesson in holding over cockerels for better markets. Let me illustrate.

fed them for five months longer at a cost of \$40, and then tried to sell. The market was glutted by the farmers dumping their product, and the average price was 20 cents per pound. We sold our flock for \$80, and lost \$60 on the transaction. This same procedure is followed each year by a lot of farmers, who either are too busy to avail

signs of molting, or stops laying, we immediately put it to the profit side of our account by killing it off. The hens that are laying in September will be good birds to hold over for your breeding pens next season.

The cockerels you hold over for breeders should have all range available and be segregated from the other birds. Feed



White Leghorn chickens on one of the irrigated homesteads of the Bureau of Reclamation.

A number of years ago, when we first took a venture in the chicken business, we had a ready sale for early broilers. At that time, we received a flat price of \$1 each for broilers that dressed 1 pound, by a high class hotel. These were Leghorns. Because of the ready sale, we conceived the idea that if they were worth so much as broilers, they would be worth a lot more if held and fattened. Result, we held over 100 birds,

themselves of the high broiler prices, or are trying out the experiment that cost us \$60 to convince us of our folly. In the fall the farmers all unload their excess birds, which naturally brings the prices down. You can not afford to use up valuable space to quarter these birds.

If you have not started culling your yearling hens, do it now. We cull the year round. As soon as we find a bird that shows

them on hard grain and do not let them get too fat. Keep a close watch for cowards. If you see the birds chasing one, and if he does not try to fight back, remove him, as he will never make a dependable breeder. I have used this indication for many years, and have not found it to fail in one instance. What you want is rugged, hardy cockerels, that will pick a scrap and come out the winner.

(Continued on page 270.)

(Continued from page 268.)

between the constructing and the producing features of the enterprise. We want every project to succeed and become the property of those who must live under it, and at the earliest possible date. No irrigation project can have the maximum success until it is operated by its resident owners—the farmers. In the meantime, the relations between those living on the project and the Govern-

ment will depend largely upon the department's contact managers.

"A Government employee's time is no more valuable than a farmer's in summer time. The word 'Private' on the office door of a Government employee is an offense. The development of an irrigation project begins and continues with the Government to completion. Its operation should begin with the settler and tend toward the Govern-

ment. The open-door policy will in the end succeed and will help immeasurably to build up the Reclamation Service from the farmer toward the department rather than from the department to the farmer.

"Please feel free to write to the department for information. There must be mutual understanding before there can be cooperation, so very necessary to the success of reclamation projects."

EXHIBIT AT POULTRY SHOWS.

(Continued from page 269.)

Your fall poultry shows and your county fairs are no doubt in progress at this time. It is good policy to exhibit some of your stock and get your name on the poultry map. Do not be discouraged if you do not win. Some one must lose, and the fact of your showing will aid you in finding out how bad your stock is, compared with the other fellow's line-up.

If you intend buying any hens for breeding next season, now is the time. I use September and October as my "barometer months" in selecting breeding stock. Male birds can be bought profitably also at this period.

Your pullets should come in from the range before the frosts arrive. All pullets should be housed at least two weeks before they start to lay. If pullets are permitted to lay out on the range, they will invariably go into a molt when they are removed to their laying quarters. Avoid this, and move in early.

See that your range houses are thoroughly cleaned and fumigated before closing up for the winter. Too many farmers let this matter go over until the next spring, and then make an attempt to get ready in a hasty way. You will now have more time than any other month. Procrastination is the thief of time, and verily this can be applied most emphatically to the poultry industry. We must do things on time. "If you have anything to do, go and do it."

COMPLAINT DEPARTMENT.

The Secretary of the Interior is desirous of receiving complaints, constructive suggestions, and information intended for the betterment of the Bureau of Reclamation.

For this purpose a Complaint Department has been organized to investigate grievances of every character existing at present, or developing in the future, with the ultimate object of correcting them.

Not only the water users and settlers upon reclamation projects but also engineers in and out of the Government service, including the public in general, are invited to forward such information coming to their notice, which may tend to a fuller cooperation between the Department and the field.

These complaints should be addressed to "Administrative Assistant to the Secretary of the Interior, Washington, D. C."

Day-old chicks are now a regular market commodity in all parts of the country and are shipped long distances.

UTILIZE OUTSIDE HELP.

Are you using the facilities at your command offered by your State agricultural department? Are you a member of any poultry association? Are you cooperating with other farmers? Or are you "smart" enough to battle your own problems? The old saying, "that every man who is his own lawyer usually has a fool as a client" is quite applicable in poultry farming. We learn every day, if not from the other fellow's success, from his failures. Let me quote from one of our great captains of industry. Mr. Charles M. Schwab some years ago visited Austria in the interests of steel. He was in company with Franz Joseph. During an inspection of a steel works the old Emperor turned to Mr. Schwab and said, "How is it that you come over here to Austria to get ideas, when in America you have all that is modern and up to date?" Mr. Schwab replied, "Your Majesty, I may not be able to get any new ideas, but I can at least see what mistakes to avoid."

Your State agricultural department stands ready to render advice and service if you will only make the request. Right now our State college has showed how to realize \$1.70 per bushel for wheat. By tests in feeding chickens at the experimental farm they prove conclusively that wheat fed to chickens will net the farmer \$1.70 per bushel. This item alone is a valuable asset to our wheat farmers. They have used an average price per dozen for eggs of 35 cents, and that is comparatively low.

Our State poultry association is rendering service to thousands of farmers in Pennsylvania. If you have an association, use it. And if you do not have one, get organized. Our daily mail brings all kinds of requests for aid. How to cull, where to buy, where to sell to the best advantage, requests for practical demonstrations in organized territories, what is the best poultry literature to read, and so on. Through the office of the secretary we are able to keep in personal contact with all our farmers and breeders. If we can not supply the information requested, we either send the request to State college, or to our State department of agriculture. Success depends upon coordination. Your State department and your agricultural colleges have no other motive in aiding you than to see you succeed. I recently talked to one of our extension men, and he told me that he could have sold hundreds of breeding males if they had been available. They act as a medium of exchange, as well as a bureau of information. They require no compensation for these little favors, and expect none. They are paid by the State and give out impartial service to all who ask. I merely quote these incidents to spur you on to greater attainments.

There are no complex problems in the poultry business that can not be solved. Our organized machinery is designed for such exigencies. Then, brother poultry farmer, you have no excuse why you should not produce more; and if this article is addressed to a nonraiser of poultry, it will behoove you to put a flock on your place, and if you have grain that can not find a ready market, feed it to your fowls and note your profits.

EFFICIENCY, KEYNOTE.

In a recent letter to the Secretary of the American Society of Civil Engineers, Secretary Work points out that what he desires is the greatest possible efficiency—not alone efficiency in one phase of the work, but efficiency in every phase and aspect of reclamation. This includes securing more creameries, sugar factories, and other industrial enterprises; more intensive farming, diversification of crops, and cooperation with the farmers in connection with packing, handling, and marketing their products by men trained along these lines.

"This does not mean a diminished construction program," says the Secretary, "but rather an increased and accelerated construction, because with the money returned to the Government under efficient business management there will be freed a fund to continue construction that otherwise will be retarded. It is not a question now of engineering so much as it is one of business acumen and operation."

"The men on the projects must reimburse the Government for its millions of dollars advanced for the reclamation of land through irrigation."

\$45,000 IS SAVED.

By a good business stroke Commissioner David W. Davis of the Bureau of Reclamation has just saved \$45,000 in the construction cost of the American Falls reservoir.

A contract with the Idaho Power Co. provided for payment by the United States to the company, for certain property needed in the American Falls development, of \$250,000 in June, 1924, and of \$250,000 in June, 1925.

Commissioner Davis correctly assumed that earlier payment might have a substantial value to the company and initiated negotiations which resulted in payment of the \$500,000 obligation in June, 1923, at a discount of \$45,000.

About the only way table scraps can be made to bring in a return in the small town or suburb is through the medium of a flock of hens.

RECLAMATION-PROJECT WOMEN AND THEIR INTERESTS.

What the boys and girls are doing through club work on the North Platte project. How two young women on Wapeco ranch made success of intensified farming.

THE North Platte project, at least that portion of it located in Scotts Bluff County, Nebr., has been thoroughly converted to the boys' and girls' club work. Pass most any farm house and somewhere out in the alfalfa you will discern a movable pig pen. There are in the county this year five pure bred pig clubs with a total of 10 girls and 38 boys each owning and taking care of one or more pigs.

These 48 boys and girls have a total of 53 pure-bred pigs, representing five breeds. There are 20 Durocs, 13 Polands, 13 Hampshires, 4 Spotted Polands, and 3 Chester Whites. With the exception of the Chester Whites the pigs were practically all bred in the valley. They will be exhibited at the Scotts Bluff County Fair, where liberal awards are offered by the fair board and the different breed associations.

In order to meet the requirements of a standard club, the boys and girls are organized into clubs of not less than five members, each club having its own officers and conducting business meetings. Each club chooses a mature person who acts as local leader and general adviser. Feed records are kept for 100 days.

In 1922 there were 591 clubs of all kinds in the State, enrolling nearly 5,000 boys and girls. The value of the products reported by the club members was \$115,307.23. The value above cost of production was \$50,522. The State boys' and girls' club premium list contained about \$5,000 in prizes, but the main object of the club work is not profit or premiums, but the training that the members themselves receive from their club activities and the value of the work in the community.

STREET DANCING.

The wide-awake town of Rupert, Minidoka project, Idaho, last year inaugurated a community recreation which proved so popular that it has been resumed for the remainder of the summer.

Promptly at 10 o'clock p. m. Saturday night, street dancing is begun to music furnished by a full orchestra. As an added feature, a free open air picture show is staged each of these nights especially for those who do not care to dance. The pavement has been put in good condition, and a screen for the pictures erected.

Practically all the merchants and other business houses contribute to the entertainment. When these dances were inaugurated last year they made a decided hit with the people of that and surrounding counties. There was talk of attaching a big amplifier to a phonograph, but the merchants will

furnish an orchestra. They believe that after the cares of the week and the Saturday night shopping are over the people of the county are entitled to some healthful recreation. The same care will be taken this year to insure the best of order.

There is also a movement on foot to resume the community singing, which a local paper states not only gave so much pleasure to Rupert citizens in past seasons but which brought neighbors in closer relationship.

A RECREATION SPOT.

People on the Minidoka project, Idaho, are taking advantage of the little park at the dam, with its refreshing shade, as a recreation spot. According to a local paper it is a common sight to see picnic parties there at most any time during the week, and on Sunday the capacity of the park is usually taxed to take care of the crowds who visit it. There is a new road from the irrigable lands to the park, which makes the entire trip an enticing adventure. The beautiful reservoir, the distant view of mountains, and the picturesque spillway add immeasurably to the beauty of the park.

TWO WOMEN RANCHERS.

The Wapeco ranch, on the Rio Grande project, New Mexico-Texas, near El Paso, owned and operated by two young women, is pointed out by local agriculturists as an example of what can be done in that locality with intensified and diversified farming.

Twenty-two months ago Miss Ward and Miss Peebles started out with a few hundred dollars, a whole lot of determination, and some good practical ideas. They have made a go of farming. They have a well-balanced diversified farm with poultry as a lead. In addition they have a garden, an orchard, and grow grapes and alfalfa. Bear in mind that their ranch consists of only 2 acres.

The orchard of 25 trees includes assorted varieties of pears, plums, peaches, apples, and apricots. These fruits are grown mainly for household use, and although the trees have only been planted two years there is a surplus for canning. Garden truck is raised on one-fourth of an acre. Most of this is corn and stock beets, the corn being marketed as roasting ears and the beets kept for poultry feed during the winter. This crop is one of the most economical and hardy that poultry raisers can grow. The rest of the garden is devoted to beans, tomatoes, peas, cucumbers, cantaloupes, Spanish peanuts, and other garden vegetables. The vegetables not required for

table use are disposed of at the front door and bring enough to cover the expenses of plowing and irrigating.

Another half acre is planted in alfalfa. Eventually most of this space will be taken up by the poultry, but in the meantime it furnishes two cuttings of alfalfa, which are baled for winter feed. The remaining growth is sold as it stands at \$10 a cutting. Last year the half acre produced six cuttings.

A vineyard takes up three-quarters of an acre. The Tokay, Mission, Muscat, and Cornishon are grown. Although these two-year plants are not up to normal production yet, 75 pounds were harvested last year. This year the owners expect to sell 20 pounds from each vine.

When Miss Ward and Miss Peebles started their ranching operations two years ago they had only 30 hens. At first they both worked in El Paso as bookkeepers, tending to the farm morning and evenings and on holidays. Last winter it was decided that one of them should spend all her time on the farm, and in the near future both partners will devote all their time to the land because of its better returns. Last winter they owned 195 laying hens. This year they will have 450. Most of the hens will show a profit of \$2.25 a year. This is over the cost of feed and marketing. They figure it costs 18 cents to produce one dozen eggs. At present eggs are retailing at 60 cents a dozen in their market.

In the winter the industrious ranchers are on the job at 4.30 a. m., because hens must have long days to produce the maximum egg supply. Long winter days are secured by supplementing daylight with electric lights.

As it is necessary for a laying hen to eat bountifully the early lighting gives them ample time to eat. After frost, when there is no more green alfalfa, bales of alfalfa are set around in convenient places for the hens to feed on. In the morning the hens are fed warm mash and given warm water to drink. According to Miss Ward it is more economical for poultry raisers to mix their own mash. She recommends the following formula, which was developed by another Rio Grande woman poultry raiser: Equal parts by weight of bran, shorts, oats, cornmeal, and meat scraps. For convenience 50 pounds are mixed at a time and stored in a bin. It must be thoroughly mixed. Each bird is fed 1½ pounds a day of the mash and 1½ pounds of scratch feed. The mash is fed early in the morning. A part of the scratch feed is fed late in the evening. About 65 per cent production is received from the flock from November to March,

when egg prices are at a minimum. At no time has the production been below 50 per cent during this period.

Two hundred and fifty fryers were sold from the farm this season at 61 cents each. This fall 60 hens—nonlayers—will be sold at about 30 cents a pound dressed. Miss Ward and Miss Peebles buy baby chicks from the highest grade California white Leghorns. Within three years they expect to have 2,000 hens on their 2 acres. At present they live in what will be their garage. Within a year or two they will build an ideal farm home. Their land cost them \$1,000 an acre and they have expended \$1,500 on improvements. They have 3 poultry houses and the land is poultry fenced. It is all paid for. A set of books showing all expenditures and costs is kept.

Except for irrigating, all the work is done by the two women, and so far they have been exchanging such practical Christmas and birthday gifts as an ax, a saw, a steam-pressure cooker, or a wheelbarrow. Miss Ward is maid of all work. She has built a quite presentable kitchen sink and drain board, poultry fence, and all gates on the farm. Both women are members of the El Paso Egg Producers' Association.

CHEESE FACTORIES WIN.

INTEREST continues to increase in the cheese factories which have been started on the Minidoka project, Idaho. Recently a new vat was installed in the factory at Rupert and the new equipment increases the capacity of the factory to almost double that possible with the old outfit. This addition to the equipment of the Rupert factory is ample evidence that the institution is operating satisfactorily both to patrons and owners. Several farmers have stated that they could get more for their hay by milking cows than in any other way. "I get \$20 for every ton of hay I feed to my cows," said one, "and I am adding to my herd just as rapidly as circumstances will permit."

More cheese factories, more creameries, more dairy cows! As pointed out in practically every speech made by Commissioner Davis on his recent trip through a number of the projects, these are the factors which will mean success on practically all the projects where alfalfa and grain are among the leading crops.

The hog converts 30 to 40 per cent of our corn crop annually into a concentrated food, and in this work of concentration he is no waster.

Hogs are frequently used to "hog down" or harvest crops, and in this way they save the labor of harvesting.

ALFALFA POPULAR WITH WESTERN FARMERS.

IT IS probable that alfalfa is not yet in its heyday. Enthusiasts, whose name is legion, believe that the possibilities of this crop are far from being realized. A great part of the nearly 10,000,000 acres now devoted to this forage is annually harvested for hay, and the conditions under which it is put up, the methods used, and the time of cutting have a great deal to do with the value of the cured product as a feed for live stock.

when they had reached a length of 1 or 2 inches or when the plants were one-tenth in bloom. The two guides seemed to be needed, as the basal shoots make very little growth in dry weather and blossoms are slow to appear in wet periods.

Recent experiments indicate that cutting at a later date than has generally been advised is more desirable, everything considered. At the Kansas Agricultural Experiment Station a comparison was made



Feed for the dairy cow. Stacking alfalfa on one of the irrigation projects.

The number of cuttings that may be taken from an alfalfa field in a season varies according to the locality and the variety from eight or occasionally more, in the extreme Southwest, to two, or sometimes only one, in the northern and semiarid regions. Thirty to forty days of good growing weather are necessary to produce a hay crop.

There are conflicting opinions on the proper time to cut alfalfa for hay. Chemical analyses show that when cut in early bloom it has slightly more protein than when cut later, and that certain animals, such as hogs and cattle, prefer it when cut in the earlier stages. These reasons and the belief that frequent cutting produced a larger total yield led to the old practice of cutting just before the flowers appeared. That practice has been discredited.

It was found that these early and frequent cuttings, although they produced greater yields the first season, usually reduced the life of the stand and the average yield over a period of years. Later the basal shoots were used as a guide, cutting being recommended

of cutting at four stages—in bud, one-tenth in bloom, full bloom, and when the seed pods were forming. The earliest cutting was highest in feeding value, but the stand was practically killed out in one season. Cutting when one-tenth in bloom gave less hay than cutting when in full bloom and seemed to encourage grass and weeds. Cutting when the seed pods were forming gave less hay than earlier cuttings, but the stand was not injured. No damage resulted from cutting the basal shoots, although it has long been taught that clipping them off will reduce the succeeding crop. The Department of Agriculture has conducted experiments which verify these results.

In regions where the rainfall is rather limited, such as the Great Plains, stands are sometimes badly injured by delaying cutting until the plants are nearly through blooming. The injury is more serious when a second cutting is made or a crop is harvested for seed. This is more serious in dry seasons when there will be very little growth after cutting as far as the plants are concerned.

WHAT THE COURTS ARE SAYING.

THE following holdings of the Supreme Court of the State of Washington relative to water rights are made in the case *In re Waters of Doan Creek* (215 Pac., 343) to wit:

The law of riparian rights, modified to the extent of reasonable use by the riparian owners, and to the extent of appropriations upon public lands, obtains in this State but a prior appropriation of water against lands belonging to the public domain until segregated is superior to riparian rights and subsequent appropriations.

Though prior to the enabling act of 1889 Congress enacted the desert land act of March 3, 1877 (19 Stat. 377) granting the right of appropriation for mining, irrigation, etc., from any streams and bodies of water upon the public lands, and after the passage of that act it might have been questioned whether the State took the lands granted by the United States Government subject to any riparian rights at all, whatever rights the State had in the water annexed to school land did not pass to any grantee until State sold such land, and those holding the land prior thereto as lessees from the State, having no interest in the land, and no intention of acquiring it, were not bona fide appropriators of the water of a stream to the benefit of the land.

The water code saves all existing rights in land and water; but that fact does not militate against the rights of the State, in the exercise of supervisory control, of administering the use of water for the public welfare, according to the various and definite rights of all parties in the water.

Upon the same general subject the same court holds as follows in the case of *Weitensteiner v. Engdahl et al.* (215 Pac. 378) to wit:

As against the owner of private property on which appropriation is made, no rights can be acquired short of adverse user for

the statutory period; but, as against subsequent appropriators not in privity with the owner of the land on which the appropriation is made, such appropriation is valid.

Where more than 10 years elapsed between the time plaintiff appropriated waters from a stream and the settlement of upper riparian land, plaintiffs acquired rights by prescription, and the successor of the upper riparian owner can not complain that plaintiff's riparian rights in the quarter section where appropriated extend the use of water so appropriated to an adjacent quarter section.

Where defendants wrongfully deprived plaintiff of water to which he was justly entitled, compelling him to resort to courts for redress, there was no error in awarding plaintiff costs in an action in which he prevailed.

MORTGAGES ON DESERT-LAND ENTRIES.

Under Montana Revised Codes 1921, sec. 8255, a mortgage on desert lands entered by mortgagors under act of March 3, 1877 (19 Stat. 377), as amended by act March 3, 1891 (26 Stat. 1096), which does not expressly prohibit alienation or mortgaging such lands, is enforceable after title vests in mortgagors on final proof and issuance of patents, as are mortgages on preemption claims under act September 4, 1841 (Rev. Stat. par. 2257-2288), such entries being inchoate interests in realty which are property rights capable of transfer within Montana Revised Codes 1921, sec. 8262, and hence subject to a mortgage. Desert-land entrymen in undisputed possession of such land at the time of their execution of a mortgage thereon have such a property interest *in case* as is subject to mortgage; title subsequently vesting in them on compliance with the terms imposed by the Government inuring to mortgagee's benefit. Mortgagors of desert-land entries are estopped from denying the validity of the mortgage and can not defeat its enforcement after acquisition of title to the lands on the issuance of patents to them; equity, which considers as done what mortgagor has distinctly agreed to do, treating the mortgage as already attaching to such property in fulfillment of the contract. A mortgage given and accepted in good faith for a present consideration is not affected by proceedings under bankruptcy act July 1, 1898 (30 Stat. 544), and may be enforced after mortgagor's discharge in bankruptcy, though he is thereby relieved from further personal liability. (*Selway v. Daut et al.*, 215 Pac. 646.)

PERCOLATING WATER IN UTAH.

Under the law of Utah, an appropriation of the water of a natural stream to a beneficial use so far attaches to underground waters feeding the stream by percolation through adjacent public lands, that one who, as an incident to mining operations after those lands have become private, intercepts and collects such percolating waters by a tunnel is not entitled to sell to others the right to use on distant lands the waters so collected and thus injuriously diminish the supply of the prior appropriator. (*Snake Creek Mining & Tunnel Company v. Midway Irrigation Company et al.*, 260 U. S. 596.; 271 Fed. 157 affirmed.)

LANDS BORDERING ON LAKES.

Lots patented under the public land laws according to a plat showing them bordering on a lake, extend to the water as a boundary and embrace pieces of land found between it and the meander line of the survey, where the failure to include such pieces within the meander was not due to fraud or mistake but was consistent with a reasonably accurate survey, considering the areas included and excluded, the difficulty of surveying them when the survey was made, and their value at that time. (*United States v. Lane et al.*, 260 U. S. 662; 274 Fed. 290, and 145, affirmed.)

DAMAGES UNDER CAREY ACT CONTRACT.

Under the Carey Act contracts pleaded in this case, the construction company still being in control of the operating company, appellant made a prima facie case by proving such contracts, failure to deliver water in accordance therewith, and consequent damage to his crops, with the amount of such damage. It was then incumbent upon respondent to prove that the failure of its water supply was due to an extraordinary drought, and that it had delivered to appellant his just proportion of the available supply. In such an action as this the construction company must show an extraordinary drought as the cause for the water shortage in order to make a good defense, and an instruction to the jury that a drought is a good defense is erroneous. Failure of water users to appoint a water master for a community ditch is not a good defense for a person, association, or corporation that is bound by contract to furnish water for irrigation if it fails to furnish the amount of water for which it is bound, but such person, association, or corporation may not be held responsible for damage resulting from the improper or unfair distribution of water from a community ditch, no matter whether the full contract amount or less has been placed therein. (*Preis v. Idaho Irr. Co., Limited*, 215 Pac. 466.)

RELATION OF WATER RIGHTS TO LAND.

A water right acquired by appropriation and used for a beneficial and necessary purpose in connection with a given tract of land is an appurtenance thereto, and as such passes with the conveyance of the land, unless expressly reserved from the grant. A water right is property which may be disposed of apart from the land by which it has been used. In a conveyance of a water right the intention of the parties, so far as lawfully expressed, must control the courts in a construction of the instrument by which the property is conveyed, in view of Montana Rev. Codes, 1921, section 10520, making the intention of the parties controlling. Where a deed to certain land expressly mentioned a water right to be conveyed, all other water rights not mentioned must be excluded from the grant, under Rev. Codes, 1921, section 7547, providing that all things that in law or usage are considered as incidental to a contract, or as necessary to carry it into effect, are implied therefrom, unless some of them are expressly mentioned, when all other things of the same class are deemed to be excluded. (*Lensing v. Day & Hansen Security Co.*, 215 Pac. 999.)

THANKS, SUNNYSIDE.

On July 30 the Sunnyside Valley Irrigation District, Yakima project, Washington, paid to the Government \$93,633.14, which is the final payment of all charges accruing for construction and operation and maintenance during the calendar year 1922. The irrigation district on this division acted as fiscal agent for the United States and collected from the individual water users up to July 1, at which date the district pays all delinquent charges in a lump sum and collects by putting them on the tax rolls.

In this connection it is interesting to remember that the Orland project, in California, makes its payments to the Government on the dot and in full, and has been doing so as far back as we can remember.

Evidently the financial condition on the projects is improving.

SMOKERS, TAKE NOTICE.

Within the limits of the town of Worden on the Huntley project, Montana, lives a man by the name of Tucker who is raising successfully Burley tobacco on the so-called heavy land that does not produce cereal or other crops usually raised in the vicinity.

Mr. Tucker is a native of southern Ohio, where he lived for 35 years in what is now part of the Burley tobacco district. Last year he raised 250 pounds of Burley tobacco and sold it locally at 50 cents per pound. Seven or eight farmers in the vicinity of Worden are growing tobacco on a small scale this season with success.

The growth of the tobacco plant is marvelous, showing leaves 30 inches long and 15 inches wide after 60 days of growth from the date of transplanting. The seed is so very small that a tablespoonful will suffice to plant 6 acres of tobacco. It is sown in a small hot-house or protected box, and the small plants are grown and transplanted much like cabbage.

Mr. Tucker states that one man can care for only 4 acres of tobacco, and that all of



Burley tobacco growing on the Huntley project, Montana.

the expense incident to the raising of 1 acre and curing the leaves would not exceed \$100.

Guano is used as a fertilizer. A very small handful is placed under each plant before

it is set out, followed by cultivation not much unlike that given to corn. It may be that Mr. Tucker has found the elements that will unlock the fertility in the soil of the heavy lands on the Huntley project.

COMPARISON BETWEEN OPERATION AND MAINTENANCE ESTIMATES AND RESULTS JANUARY 1 TO JULY 31, 1923.

Project.	Gross cost.				Net accruals and revenues.				
	Estimate for 1923.		Actual cost to July 31.	Amount * over or under estimate.	Estimate for 1923.		Actual returns to July 31.	Amount more or * less than estimate.	Area paying charges.
	Total for year.	To July 31.			Total for year.	To July 31.			
UNDER PUBLIC NOTICE.									
Belle Fourche.....	\$70,000	\$47,000	\$37,383	\$9,617	\$72,000	\$7,880	\$8,996	\$1,116	Acres.
Boise.....	290,000	176,000	147,750	28,250	241,492	167,000	148,000	* 19,000	72,448
Carlsbad.....	40,000	25,500	23,580	1,920	55,530	37,000	38,710	1,710	161,500
Huntley.....	41,000	25,000	24,648	352	42,000	22,500	16,000	* 6,500	25,000
King Hill.....	33,515	22,000	13,600	8,400	33,515	24,861	25,280	419	21,800
Klamath (Tule Lake).....	12,400	5,900	2,592	3,308	12,443	8,820	2,700	* 6,143	9,920
Klamath (main).....	55,000	38,140	40,946	* 2,806	55,647	39,050	40,333	1,483	42,105
Lower Yellowstone.....	40,000	28,000	24,656	3,344	30,741	25,000	20,117	* 4,883	46,000
Minidoka (south side).....	94,000	56,779	49,000	7,779	99,300	56,855	54,873	* 1,982	48,000
Newlands.....	111,400	69,511	84,930	* 15,469	114,000	76,820	72,562	* 4,258	67,741
North Dakota pumping.....	32,900	(?)	(?)	(?)	102,167	(?)	(?)	(?)	7,653
North Platte (interstate).....	175,000	108,000	100,000	8,000	151,000	80,000	80,000		110,000
North Platte (Northport).....	24,000	13,000	8,200	4,800	24,000	8,200	8,200		15,000
Okanogan.....	52,200	32,225	27,950	4,275	54,100	38,880	35,250	* 3,630	6,918
Orland.....	33,000	21,900	21,052	848	33,618	21,300	21,300		20,174
Rio Grande.....	222,000	(?)	(?)	(?)	250,000	(?)	(?)	(?)	140,500
Shoshone.....	66,000	37,150	36,800	350	66,000	52,200	41,000	* 11,200	58,700
Strawberry Valley.....	* 25,000	13,600	13,200	400	49,200	25,800	30,000	* 4,200	46,846
Sun River (Fort Shaw).....	11,100	8,100	8,289	* 189	11,500	8,500	7,500	* 1,000	10,100
Uncompahgre.....	135,000	87,000	92,808	* 5,808	144,500	95,500	96,000	500	90,000
Umatilla.....	37,225	23,300	23,000	300	37,225	26,685	29,000	2,315	24,592
Yakima (Sunnyside).....	145,000	87,105	77,208	9,897	150,767	95,000	95,000		97,205
Yakima (Tieton).....	96,000	54,000	55,800	* 1,800	89,500	55,625	51,500	* 4,125	32,000
Yuma.....	290,000	185,000	200,000	* 15,000	292,500	182,000	206,000	* 24,000	63,200
Total.....	2,131,740	1,164,210	1,113,442	50,768	2,212,765	1,155,476	1,128,521	* 26,955	1,227,402
UNDER WATER RENTAL.									
Grand Valley.....	50,000	31,000	25,000	6,000	51,300	33,500	30,200	* 3,300	20,000
Milk River (including St. Mary).....	69,000	43,759	47,959	* 4,200	18,600	15,330	11,700	* 3,630	45,170
North Platte (Fort Laramie).....	90,000	57,000	42,500	14,500	90,000	42,500	42,500		46,000
Sun River (Greenfields).....	22,000	14,000	12,074	1,926	22,100	16,000	1,350	* 14,650	18,000
Total.....	231,000	145,759	127,533	18,226	182,000	107,330	85,750	* 21,580	129,170
INDIAN.									
Blackfeet.....	30,000	19,000	15,611	3,389	16,400	15,500	1,243	* 14,257	20,000
Flathead.....	55,000	37,000	32,399	4,601	54,500	33,000	14,705	* 18,295	35,000
Fort Peck.....	15,450	9,700	7,875	1,825	1,100	1,000	2,155	1,155	1,100
Total.....	100,450	65,700	55,885	9,815	72,000	49,500	18,103	* 31,397	57,000

¹ Returns regulated by district contracts.

² Not received in time for publication.

* Not including tunnel repairs.

¹ Including instalment of \$5,000 for tunnel repairs.

ANOTHER BIG SAVING.

On the Newlands project, Nevada, drainage work has been under way for about 22 months. At the end of June, 1923, a total of \$535,445.97 had been spent. This includes \$19,010.62 for investigations mostly completed before construction work started. On

July 1 a total of 381,113 linear feet or 110 miles of drain had been completed at an average cost of \$4,868 per mile, including all overhead. The estimated cost of constructing these drains was \$7,000 per mile. A total of 4,398,650 cubic yards of material had been excavated at a field cost of \$0.078 per cubic yard. The work is being done with

two class 14 Bucyrus drag lines, three 1-T Monighan drag lines, one class 208 P. & H. drag line, and one class 4 Austin drag line, all of which are operated on a two-shift basis with the exception of the 1-yard Austin, which is on a one-shift basis.



Grapefruit growing on the Mesa Division, Yuma project, Arizona.

CROP PRICES, JULY, 1923.

Project.	In stack.	Baled at shipping point.	Alfalfa hay, per ton.	Barley, per bushel.	Oats, per bushel.	Wheat, per bushel.	Potatoes, per bushel.
Salt River.....	\$8.00	\$12.00	\$0.80	\$0.60	\$1.10	\$2.10	
Yuma.....	12.00	16.00				.95	
Orland.....	9.00	13.00	.60			.96	
Grand Valley.....	10.00	13.00		.50		.85	.70
Uncompahgre.....	8.00			.68		.75	.75
Boise.....							
King Hill.....	8.00						.61
Minidoka.....	6.00	10.00	.42	.42	.65		
Huntley.....							
Milk River.....	8.00		.31	.50	.96	2.10	
Sun River.....	7.50	10.50	.65	.65	.95	1.80	
Lower Yellowstone.....			.33	.20	.90		
North Platte.....							
Newlands.....	8.00	12.50	.75		1.20	1.80	
Carlsbad.....		18.00					
Rio Grande.....		18.20					
North Dakota pumping.....	15.00		.42		.91	1.50	
Umatilla.....	13.50					.90	
Klamath.....	10.00		.72	.61	.90		
Belle Fourche.....				.32	.80	2.00	
Strawberry Valley.....	10.00		1.15	.85	1.15	1.44	
Okanogan.....	15.00						
Yakima.....		10.50					
Riverton.....			.60	.50	.75		
Shoshone.....		12.00		.74	.68		
Indian projects:							
Blackfeet.....	7.50		.27	.32	.75	1.80	
Flathead.....	9.00				.71	2.10	
Fort Peck.....	10.00			.50	.86	.50	

MONTHLY CONDITIONS OF PRINCIPAL BUREAU OF RECLAMATION RESERVOIRS FOR JULY, 1923.

[Elevation above sea level.]

State and project.	Reservoir.	Available capacity in acre-feet.	Elevation.		Storage in acre-feet.			Out-flow in acre-feet.	Elevation of water surface.		
			Spill-way crest. ¹	Lowest gate sill. ²	Beginning of month.	End of month.	Maximum.		Beginning of month.	End of month.	Maximum.
Arizona, Salt River.....	Roosevelt ³	1,575,000	2128.1	1924.6	513,138	432,433	513,138	80,705	2086.37	2077.73	2086.37
California, Orland.....	East Park.....	51,000	1199.68	1111.68	38,450	24,550	38,450	12,700	1192.27	1181.98	1192.27
Idaho:											
Boise.....	Arrowrock.....	280,000	3211	2956							
	Deer Flat.....	177,000	2518	2488							
Minidoka.....	Lake Wolcott.....	95,180	4245	4236	109,190	108,800	110,100	449,058	4246.15	4246.12	4246.22
	Jackson Lake.....	847,000	6769	6728	847,000	586,240	847,000	418,100	6769	6758.4	6769
Montana:											
Milk River.....	Nelson.....	70,000	2223	2200	34,000	31,000	34,000	1,230	2214.77	2213.84	2214.77
St. Marys storage.....	Sherburne.....	66,000	4788	4720	27,680	44,440	44,440		4760.2	4773.9	4773.9
Sun River.....	Willow Creek.....	16,700	4130	4085	14,311	14,693	15,171	686	4127.5	4127.9	4128.4
Nebraska-Wyoming, North Platte.....	Pathfinder.....	1,070,000	5852	5670	1,118,600	981,030	1,118,600	326,732	5854.16	5847.94	5851.16
	Lake Alice.....	11,400	4182	4159	8,300	10,000	10,470		4178	4180.2	4180.8
	Lake Minatare.....	60,760	4125	4074	63,500	52,800	63,500		4125.2	4121.2	4125.2
Nevada, Newlands.....	Lake Tahoe.....	120,000	6230	6224				11,072	6227.26	6227.21	6227.3
	Lahontan.....	273,600	4162	4063	255,250	216,100	255,250	62,994	4160.1	4153.6	4160.1
New Mexico:											
Carlsbad.....	McMillan.....	45,000	3267.7	3241.6	4,500		4,500	10,500	3257.3	3253.1	3257.3
Rio Grande.....	Elephant Butte.....	2,638,000	4407	4231.5	1,533,042	1,412,346	1,533,042	128,122	4374.4	4370.2	4374.4
Oregon, Umatilla.....	Cold Springs.....	50,000	621.5	560	48,000	33,600	48,000	13,639	620.18	609.57	620.18
Oregon-California, Klamath.....	Clear Lake.....	462,000	4540	4514	360,000	353,000	360,000		4536.1	4535.8	4536.1
South Dakota, Belle Fourche.....	Belle Fourche.....	203,000	2975	2920	176,900	167,310	176,900	23,683	2971.5	2970.2	2971.5
Utah, Strawberry Valley.....	Strawberry.....	250,000	7558	7517	258,600	237,800	254,600	20,800	7559	7556.3	7559
Washington:											
Okanogan.....	Conconully.....	14,400	2290	2232	10,220	7,036	10,220	5,098	2280.5	2272.1	2280.5
Yakima.....	Bumping Lake.....	34,000	3426	3389	38,190	34,670	39,015	345	3429.35	3429.7	3429.95
	Lake Cle Elum.....	20,800	2134	2122	28,925	25,510	28,925	3,415	2136.13	2134.66	2136.13
	Lake Kachess.....	210,000	2258	2192	215,870	182,820	226,245	43,425	2256.83	2249.16	2259.17
	Lake Keechelus.....	152,000	2515	2425	155,935	144,160	159,105	14,945	2516.28	2511.58	2517.52
Wyoming, Shoshone.....	Shoshone.....	456,600	5360	5132.3	473,491	461,291	476,228	245,630	5362.5	5360.7	5362.9

¹ Or maximum storage.

² Or zero storage.

³ Zero water depth at elevation 1902.2.

⁴ Amount of silt shown by silt survey deducted from original capacity.

⁵ Proposed regulation.

⁶ Estimated low-water limit under proposed plan of regulation.

⁷ Elevation of reservoir raised 12 inches by stop logs in spillway.

AMERICAN FALLS DAM.

Mr. H. C. Wones, well-known poet of American Falls, Idaho, has sent a clipping from the American Falls Press containing a recent poem by him, "inscribed to the city of American Falls, Idaho, on the banks of the Snake River, where the United States Government, through the Interior Department, has just authorized the building of the greatest irrigation dam in the history of the world." The poem is as follows:

TO THE OPTIMISM OF AMERICAN FALLS.

Here the immortal ships of thought
Fly with the speed of light,
And bear the tethered souls of men
Upon their wings in flight.

Long, long imprisoned in her cell,
Where mighty torrents thunder by,
How oft her hopes have mounted up,
Alas, to fade and die.

To-day across the mountain peaks
A glorious light appears,
And men with gladdened hearts arise,
To greet their dreams of years.

Deserts remote, and sage-clad plains,
In symphonies sublime,
Shall herald to the ends of earth
This monument of time.

WATCH YOUR HOGS.

The diseases and ailments which are important factors in reducing the profits of hog raisers, particularly the old enemy, hog cholera, are described and prescribed for in Farmers' Bulletin 1244, Diseases, Ailments, and Abnormal Conditions of Swine, issued recently by the Department of Agriculture, a copy of which should be in the hands of every hog raiser on our projects.

Although the ravages of hog cholera have been reduced 60 per cent below the worst years, lack of attention to herds and failure to apply all the precautions available leave it still the greatest menace to the industry.

PLEASE PAGE NOAH.

On the afternoon of July 22 a series of cloudbursts occurred on the Riverton project, Wyoming, which were followed by heavy rains for several days. On the 24th, 2 inches of rain fell in 30 minutes at the diversion dam. The Wind River at Riverton increased from 3,000 second feet on the 22d to a peak flow of 12,000 second feet, which passed Riverton at 5 a. m., July 25. Both irrigation systems in the Riverton Valley were put out of commission. It is estimated that the damage done on the project will amount to \$10,000 to \$15,000, and that the delay to the construction program would be two or three weeks.

ADMINISTRATIVE ORGANIZATION.

DEPARTMENT OF THE INTERIOR.

Hon. HUBERT WORK, Secretary of the Interior.
EDWARD C. FINNEY, First Assistant Secretary.
FRANCIS M. GOODWIN, Assistant Secretary.
JOHN H. EDWARDS, Solicitor for the Interior Department.
EBERT K. BURLEW, Administrative Assistant to the Secretary.
JOHN H. MCNEELY, Assistant to the Secretary.
JOHN HARVEY, Chief Clerk.

BUREAU OF RECLAMATION.

WASHINGTON, D. C.

David W. Davis, commissioner; Miles Cannon, field reclamation commissioner; Morris Bien, assistant commissioner; Ottamar Hamel, chief counsel; J. B. Beadle, commissioner's assistant; C. J. Blanchard, statistician; Hugh A. Brown, editor and office assistant; C. A. Bissell, engineer; J. M. Luney, chief accountant; C. A. Lyman, repayment accounting; Miss H. A. Fellows and Raymond Depue, fiscal agents; C. H. Fitch, chief clerk; G. W. Numbers, appointment clerk; H. N. Bickel, Yakima, Wash., and W. F. Kubach, Denver, Colo., examiners of accounts.

DENVER, COLO.

F. E. Weymouth, chief engineer, Wilda Building, Denver, Colo.; R. F. Walter and C. P. Williams, assistant chief engineers; Miss L. H. Meisel, secretary to the chief engineer; J. M. Gaylord, electrical engineer; J. L. Savage, designing engineer; James Munn, engineer; W. A. Meyer, chief clerk; A. McD. Brooks, purchasing agent; Harry Caden, fiscal agent.

PROJECT ORGANIZATION.

Belle Fourche Project.—B. E. Hayden, project manager, Newell, S. Dak.; R. C. Walber, chief clerk.

Boise Project.—J. B. Bond, project manager, Boise, Idaho; Walter Ward, engineer in charge construction Black Canyon Dam; E. R. Mills, chief clerk; C. F. Weinkauff, fiscal agent.

Carlsbad Project.—L. E. Foster, project manager, Carlsbad, N. Mex.; V. L. Minter, chief clerk and fiscal agent.

Grand Valley Project.—S. O. Harper, project manager, Grand Junction, Colo.; W. J. Chiesman, chief clerk.

Huntley Project.—A. R. McGinness, project manager, Ballantine, Mont.; H. S. Elliott, chief clerk; Miss M. C. Simek, fiscal agent.

King Hill Project.—A. M. Rawn, project manager, King Hill, Idaho; T. W. Hause, chief clerk.

Klamath Project.—H. D. Newell, project manager, Klamath Falls, Oreg.; N. G. Wheeler, chief clerk; G. R. Barnhart, fiscal agent.

Lower Yellowstone Project.—H. A. Parker, project manager, Savage, Mont.; E. R. Scheppelmann, chief clerk.

Milk River Project.—G. E. Stratton, project manager, Malta, Mont.; E. E. Chabot, chief clerk; G. S. Moore, fiscal agent.

Minidoka Project.—Barry Dibble, project manager, Burley, Idaho; Dana Templin, engineer; E. C. Diehl, chief clerk; Miss A. J. Larson, fiscal agent; F. A. Banks, engineer, American Falls, Idaho.

Newlands Project.—J. F. Richardson, project manager, Fallon, Nev.; A. W. Walker, engineer; G. B. Snow, chief clerk; Miss Ethel M. Simmonds, fiscal agent.

North Dakota Pumping Project.—W. S. Arthur, project manager and chief clerk, Williston, N. Dak.; H. C. Melas, fiscal agent.

North Platte Project.—Andrew Weiss, project manager, Mitchell, Nebr.; H. W. Bashore, engineer, Fort Laramie Division; T. W. Parry, irrigation manager; J. R. Ummel, chief clerk; Mrs. A. L. Truax, fiscal agent.

Okanogan Project.—Calvin Casteel, project manager, Okanogan, Wash.; W. D. Funk, chief clerk and fiscal agent.

Orland Project.—R. C. E. Weber, project manager, Orland, Calif.; E. T. Eriksen, engineer; C. H. Lillingston, chief clerk and fiscal agent.

Rio Grande Project.—L. M. Lawson, project manager, El Paso, Tex.; C. A. Peavey, chief clerk; L. S. Kennicott, fiscal agent.

Riverton Project.—H. D. Comstock, project manager, Riverton, Wyo.; L. H. Mitchell, engineer; R. B. Smith, chief clerk; W. J. Fogarty, fiscal agent.

St. Mary Storage Division.—R. M. Snell, project manager, Browning, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Salt River Project.—Being operated by the Salt River Valley Water Users' Association; C. C. Cragin, general superintendent and chief engineer, Phoenix, Ariz.

Shoshone Project.—J. S. Longwell, project manager, Powell, Wyo.; J. R. Iakisch, engineer; C. M. Jump, superintendent of irrigation; W. F. Sha, chief clerk; Miss L. C. Drinkwater, fiscal agent.

Strawberry Valley Project.—W. L. Whittemore, project manager, Provo, Utah; H. R. Pasewalk, chief clerk; W. C. Berger, fiscal agent.

Sun River Project.—G. O. Sanford, project manager, Great Falls, Mont.; F. W. Johnson, chief clerk; F. C. Lewis, fiscal agent; G. A. Benjamin, irrigation manager, Fairfield, Mont.

Umatilla Project.—H. M. Schilling, project manager, Hermiston, Oreg.; R. M. Conner, engineer in charge construction McKay Dam; G. C. Patterson, chief clerk and fiscal agent.

Uncompahgre Project.—L. J. Foster, project manager, Montrose, Colo.; G. H. Bolt, chief clerk; F. D. Helm, fiscal agent.

Yakima Project.—J. L. Lytel, project manager, Yakima, Wash.; R. K. Cunningham, chief clerk; J. C. Gawler, fiscal agent; M. D. Scroegs, superintendent of irrigation, Sunnyside, Wash.; J. S. Moore, superintendent of irrigation, Route 6, Yakima, Wash.; F. T. Crowe, engineer in charge construction Tieton Dam, Rimrock, Wash.; C. F. Gleason and W. C. Christopher, engineers; V. G. Evans, chief clerk; E. V. Hillius, fiscal agent.

Yuma Project.—P. J. Preston, project manager, Yuma, Ariz.; R. M. Priest, superintendent of construction; D. C. McConaughy, engineer, Yuma Mesa Division; D. C. Caylor, superintendent of irrigation; C. A. Denman, chief clerk; E. M. Philabaum, fiscal agent.

INDIAN PROJECTS.

Blackfeet Project.—R. M. Snell, project manager, Browning, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Flathead Project.—C. J. Moody, project manager, St. Ignatius, Mont.; S. A. Kerr, engineer in charge construction Hubbard Dam; J. M. Swan, chief clerk; J. P. Siebeneicher, fiscal agent.

Fort Peck Project.—E. L. Decker, acting project manager, Poplar, Mont.; Henry Berryhill, chief clerk and fiscal agent.

FIELD LEGAL OFFICES.

Boise, Idaho.—B. E. Stoutemyer, district counsel. Projects: Boise, Minidoka, King Hill, and Jackson Lake Enlargement.

Denver, Colo.—Law section office of chief engineer: R. M. Patrick and Armand Offutt, district counsel.

Las Cruces, N. Mex.—Mark B. Thompson, attorney. Projects: Rio Grande, Carlsbad, and Hondo.

Helena, Mont.—E. E. Roddis, district counsel, Helena, Mont. Projects: Blackfeet, Flathead, Fort Peck, Huntley, Milk River, St. Mary Storage, Sun River, North Dakota Pumping, Lower Yellowstone, and Shoshone.

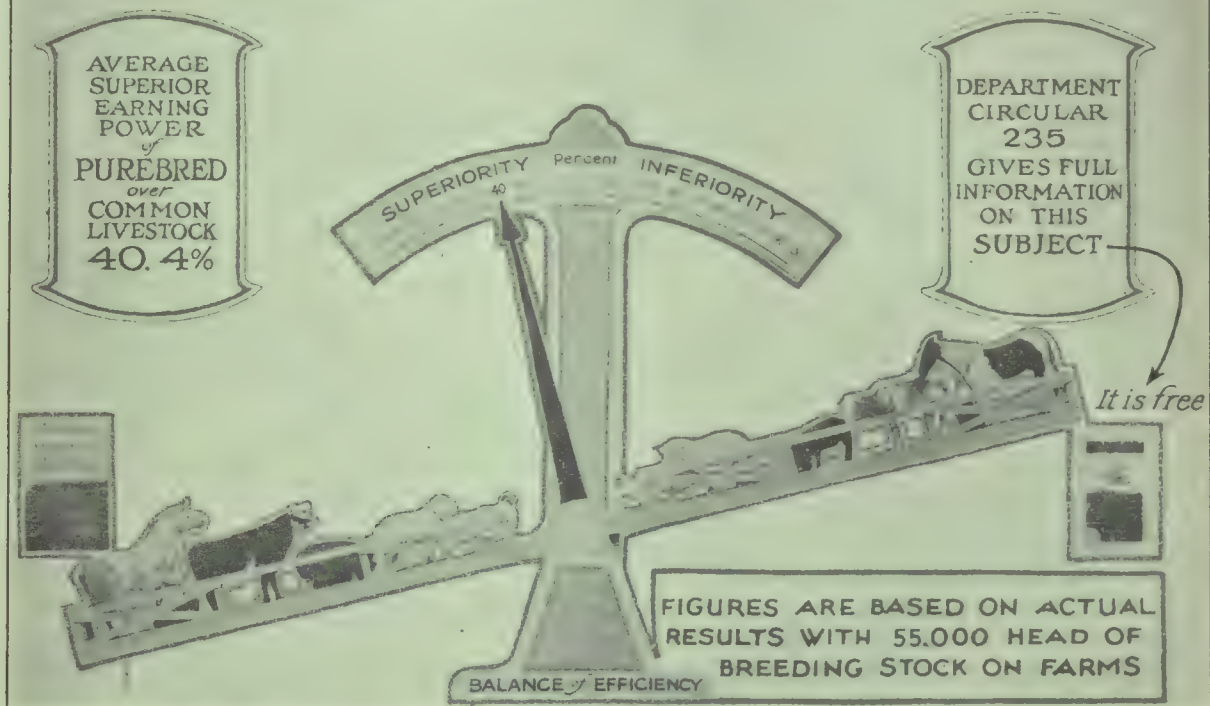
Mitchell, Nebr.—J. N. Beardslee, district counsel, projects: North Platte, Belle Fourche, and Riverton.

Montrose, Colo.—J. R. Alexander, district counsel. Projects: Grand Valley, Uncompahgre, and Strawberry Valley.

Portland, Oreg.—H. L. Holgate and D. G. Tyree, district counsel, Post Office Building. Projects: Yakima, Okanogan, Umatilla, Klamath, and Baker.

San Francisco, Calif.—P. W. Dent and Brooks Fullerton, district counsel, 349 Pacific Building. Projects: Salt River, Yuma, Orland, and Newlands.

VALUE OF PUREBREDS



From exhibit of U. S. Department of Agriculture at 1922 International Livestock Exposition

WHY PUREBREDS EXCEL:

Better conformation and quality
More product for the feed
Greater uniformity

Earlier maturity
More salable
Offspring more valuable



UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF ANIMAL INDUSTRY



Do You Know

That the Department of the Interior through the Bureau of Reclamation has constructed

*100 storage and diversion dams;
27 miles of tunnel;
8,000 bridges;
12,500 miles of canals, ditches, and drains;
1,450 buildings;
83 miles of railroad;
560 miles of pipe line;
130 miles of flume;
3,000 miles of telephone line;
1,000 miles of wagon road;
970 miles of electric transmission line?*

That it has excavated 200,000,000 cubic yards of material, equivalent to an excavation 1 mile on a side and nearly 200 feet deep?

That the storage capacity of the reservoirs is 10,000-000 acre-feet?

That the farms on the projects produce crops of an annual gross value of \$50,000,000?

That since water was first available for irrigating these lands the gross cumulative value of the crops has been \$500,000,000?

That as a result of irrigation the value of farm and town property within the projects has been increased another \$500,000,000?

The Reclamation Record

Vol. 14

SEPTEMBER, 1923

No. 9



THE BIG RED APPLES OF THE GOLDEN WEST.

TABLE OF CONTENTS.

	<i>Page.</i>
<i>Fact-finding commission to investigate system</i>	277
<i>Complaint department established</i>	277
<i>One acre in poultry pays Minidoka farmer</i>	278
<i>Cooperative marketing in Uncompahgre Valley</i>	279
<i>Cooperative marketing of eggs is profitable</i>	280
<i>Cooperation pays in selling alfalfa</i>	280
<i>Farmers organize cooperatively</i>	280
<i>Development of irrigable area planned for future</i>	281
<i>To aid farmers</i>	281
<i>Crop conditions on the projects</i>	282
<i>The wonderful development of the poultry industry</i>	283
<i>Poultry investment over \$1,000,000,000</i>	283
<i>Plan proposed for building projects by contract</i>	284
<i>Yuma project buys many automobiles</i>	284
<i>Malone diversion dam on Klamath project built</i>	285
<i>Reclamation-project women and their interests</i>	286
<i>Feed the family and sell the surplus</i>	286
<i>Interior Department dries up a lake</i>	287
<i>Stop water pollution by bathing in canals</i>	287
<i>Be a booster</i>	287
<i>From a legal standpoint</i>	288
<i>"Damnum absque injuria"</i>	288
<i>Notes from reclamation projects</i>	289
<i>Not so bad</i>	289
<i>Commissioner Davis inspecting projects</i>	290
<i>Feed wheat to stock when prices are low</i>	290
<i>One orchard produces 40 carloads of apples</i>	290
<i>Crop report, Belle Fourche project, S. Dak., 1922</i>	291
<i>Crop report, Strawberry Valley project, Utah, 1922</i>	291
<i>Monthly conditions of principal Bureau of Reclamation reservoirs for August, 1923</i>	292
<i>Comparison between operation and maintenance estimates and results</i>	292

THE RECLAMATION RECORD is sent, without direct charge, to the water users on the irrigation projects of the Bureau of Reclamation. To other than water users the price is 75 cents per year, payable in advance. Subscriptions should be sent to the Chief Clerk, Bureau of Reclamation, Washington, D. C., and remittances (postal money order or New York draft) should be made payable to the Special Fiscal Agent, Bureau of Reclamation. Postage stamps will not be accepted.

THE RECLAMATION RECORD

Issued monthly by the Department of the Interior, Bureau of Reclamation, Washington, D. C.

HUBERT WORK
Secretary of the Interior

DAVID W. DAVIS
Commissioner, Bureau of Reclamation

Vol. 14

SEPTEMBER, 1923

No. 9

FACT-FINDING COMMISSION TO INVESTIGATE SYSTEM.

Secretary of the Interior Work invites seven citizens of national reputation and prominence to serve as members and conduct intensive study of Government methods of irrigation of arid and semiarid lands.

THE formation of a fact-finding commission to investigate the whole system of Government methods in reclaiming arid and semiarid lands by irrigation has been inaugurated by Secretary of the Interior Work.

Invitations have been sent to seven citizens of national reputation and prominence asking them to serve as members of the commission and conduct an intensive study of the problem which is characterized as one of "national concern." This is in furtherance of a policy instituted last April.

Included in the list are a former Secretary of the Interior, the head of the United States Chamber of Commerce, an author and engineer on reclamation and irrigation of international note, two former governors of Western States, the president of the American Farm Bureau Federation, and a well-known college president of western agricultural institutions.

The Secretary of the Interior in outlining the reclamation situation declared that "it is generally reported that relatively few of the original settlers on projects now remain on them as water users." He also cited the fact that "one hundred and thirty-four millions of Government money have been expended" for reclamation and but "fourteen millions have been returned" while "six millions are due and unpaid."

Leading citizens of the United States invited to serve on the commission included—

Julius Barnes, president United States Chamber of Commerce, Washington, D. C.

Oscar E. Bradfute, president American Farm Bureau Federation, Xenia, Ohio.

Hon. James R. Garfield, former Secretary of the Interior, Cleveland, Ohio.

Elwood Mead, engineer and author of works on irrigation and reclamation, 2736 Bancroft Way, Berkeley, Calif.

Former Gov. Thomas E. Campbell, of Arizona, Phoenix, Ariz.

Former Gov. David W. Davis, of Idaho, commissioner of reclamation.

Dr. John A. Widtsoe, former president of

State University and State Agricultural College of Utah, Salt Lake City, Utah.

The commission, according to the plans, is to be furnished with suitable offices in the Department of the Interior building and all necessary data, information, and courteous assistance given the members by the Bureau of Reclamation in their investigation.

The letter of invitation by the Secretary of the Interior was as follows:

"The purpose of this letter is to invite you to serve with six other men having national confidence, on a fact finding commission, to make an intensive study of the policy, application, and operation of Government methods of reclaiming arid lands by irrigation, which has become a matter of national concern.

"It is generally reported that relatively few of the original settlers on projects now remain on them as water users. One hundred and thirty-four millions of Government money have been expended. Fourteen millions have been returned and six millions are due and unpaid as of December 31, 1922, to which must very soon be added computations for the present calendar year.

"Time extensions for payment of both construction and maintenance charges have been asked which, if granted, would multiply deferred annual payments, it is feared, beyond the ultimate ability of the settler

to pay, entailing probable loss of his home and to the Government the loss of the investment.

"The purpose of this inquiry, in which I very much hope you may participate, is to have the processes of administration of this trust reviewed by men of affairs applying their best thought to this important governmental agency.

"Reclamation has done much toward the development of the West, but it now clearly requires to be adapted to existing conditions, so that its future success may be achieved and the possibility of home ownership be assured to settlers.

"Your commission will, of course, be provided with suitable offices, necessary data, and the courteous assistance of the Bureau of Reclamation.

"As the work progresses you will be supplied with itemized statements and complaints coming in of which I must take cognizance, and which may serve to indicate the direction the commission may be prompted to take in its inquiries.

"Although only recently charged with the responsibility of reclamation, I am not a stranger to the irrigation of arid lands, but prefer, however, not to suggest procedure and would not expect to advance opinions to this commission unless requested, asking only that the questions may be treated with

COMPLAINT DEPARTMENT ESTABLISHED.

THE Secretary of the Interior is desirous of receiving complaints, constructive suggestions, and information intended for the betterment of the Bureau of Reclamation.

For this purpose a Complaint Department has been organized to investigate grievances of every character existing at present, or developing in the future, with the ultimate object of correcting them.

Not only water users and settlers upon reclamation projects but also engineers in and out of the Government service, including the public in general are invited to forward such information coming to their notice, which may tend to a fuller cooperation between the department and the field.

These complaints should be addressed to "Administrative Assistant to the Secretary of the Interior, Washington, D. C."

open publicity and that I may transmit your report to Congress.

"Awaiting your prompt reply and hoping for your cooperation, I remain."

Those who have advised Secretary Work they will undertake the task intrusted to them are Julius H. Barnes, president of the Chamber of Commerce of the United States; Oscar E. Bradfute, president American Farm Bureau Federation, Xenia, Ohio; former Gov. Thomas E. Campbell, of Arizona; Dr. John A. Widtsoe, former president State University and State Agricultural College of Utah, Salt Lake City, Utah; and former Gov. David W. Davis, of Idaho, Commissioner of Reclamation. Former Secretary of the Interior James R. Garfield and Elwood Mead, of Berkeley, Calif., the latter a noted authority on engineering reclamation and irrigation work and colonization, also were invited to serve, but at present both are out of the country.

Secretary Work advised the members of the new commission that every facility at the disposal of the Department of the Interior would be placed absolutely at their service; that he wished every phase of the situation gone into thoroughly, and that he would appreciate a blunt and unvarnished report of conditions precisely as they may be found to exist, whether good or bad.

The Secretary explained further that when the report of this commission is completed he shall present it in toto to the President, the Congress, and the American public.

"If obsolete or antiquated methods are being employed, if the Government is failing in its service to the farmers of the great West, or the water users are or are not able to meet their obligations to the Government, if inefficiency exists in any branch of the service, or waste and lax principles are adding to the Government's burden and impairing its responsibility to its people, then," Secretary Work said, "the President, the Congress, and the public are entitled to know the truth."

The Secretary of the Interior explained further that the purpose of the review of the Bureau of Reclamation was to check up "what many people believe to be a failing activity of the Government. Requests for extension of time on deferred payments are being urged, and a readjustment of reclamation policies has become imperative to insure permanency of operation."

The commission is asked to ascertain the whole amount of money expended by the Government and returned to it; the total sum owing but not due, and the amount due but unpaid; the relation between estimates and final costs; between expenditures and returns represented by structures, and to suggest the best approved methods of accounting, if not already practiced; the construction costs and methods employed to get water to the land; the methods of application of water in agriculture; original esti-

mated costs of projects with actual costs; estimated time necessary for completion with actual time intervening; number of acres proposed to irrigate, with actual number under irrigation; estimated cost per acre to water users before the work was begun, with the actual cost when completed; whether the service lent itself to promotion or sought to determine possibilities and requirements of the locality; whether or not the Government has obligated buyers of water to a higher acre cost than first proposed; if rates charged are impossible of payment from the land; if the Government's service is adequate; if the Government has kept faith with the settlers by fulfilling its obligations for water supply; if delinquencies of payment have been unavoidable.

"No comprehensive, independent, and comparative study of the success, partial success, or failure of reclamation projects, I believe," Secretary Work said, "has ever been made by investigators who have had original official records opened to them.

"The investigations," he added, "are intended to treat with the physical and financial operation of the service, as divorced from the agricultural, which is being studied by men who have practical knowledge of that branch of the service. Engineering and agriculture are being thus treated independently. The present condition of each shall be appraised and the Government's relation to both jointly determined."

The Orland project, California, harvested an unusually large crop of almonds. Indications were favorable for a satisfactory price.

ONE ACRE IN POULTRY PAYS MINIDOKA FARMER

Hyrum J. Wells has demonstrated that poultry can be made a paying proposition on a 1-acre chicken farm. In January, 1919, Mr. Wells bought 1 acre of land near Burley, on the Minidoka project, Idaho, for \$650 down and \$25 a month until the balance of \$1,250 was paid with interest at 8 per cent. He put up a dwelling house, chicken house for 25 chickens, and a one-cow stable. In December, 1920, he was injured and had to give up his job in the sugar factory. At that time he had 16 hens and a rooster, and a very lame back. His last pay check was invested in 300 White Leghorn chicks, from which he got 140 pullets and 100 fliers. The latter brought him \$50 at three months. In six months the pullets were laying.

Mr. Wells says that in August, 1923, he had his place paid for, fenced chicken-tight, with a garden fenced separately, that he raises a fine vegetable garden, with all the strawberries and raspberries he can use; and that he has hencoops and yard for 1,000 hens. In addition he has a stable that will accommodate two horses and two cows, a hay yard for 5 tons of hay, a good buggy shed and a buggy, and as comfortable a bungalow as one could wish.

He keeps two hogs and usually puts up about 600 pounds of pork each fall; and sells a bucket of cream each week. Fresh eggs are delivered every day to city customers, returning about 5 cents a dozen more than the stores charge.

As Mr. Wells expresses it: "We are on easy street financially and the Leghorn hen has done it."



Bringing the water to the thirsty land.

COOPERATIVE MARKETING IN UNCOMPAHGRE VALLEY.

The story of the formation of the biggest cooperative marketing organization ever attempted in the State of Colorado, as told by one of the project farmers.

IF THE Uncompahgre Valley farmers start in to do something, don't get in their way, for they will see it through to the finish; consequently, the successful formation of the Colorado Potato Growers' Exchange is a distinct triumph for strenuous efforts and loyal teamwork. Furthermore the plan had all the elements of success. It was badly needed, it was based on sound business principles, and it had the support of the intelligent farm leaders in all communities.

W. E. Heppe, who explained the fundamental principles of successful cooperative marketing and briefly the particular plan being considered. It was decided to hold a mass meeting for all potato growers to consider the contract in detail on February 28 at Montrose and on March 1 at Olathe. At the meeting in Montrose the contract was read and explained in detail to 125 potato growers. Ninety per cent expressed themselves in favor of the contract, the rest not voting but likewise not opposing.

planation of the contract and the plan to the potato growers through meetings in all of the communities.

A similar meeting was held at Olathe, and arrangements were made for the follow-up work in the communities. As there was no organization at Delta through which this plan could be presented, a meeting of representative farmers was arranged for and the plan indorsed and arrangements made as at Montrose and Olathe. From the western slope the work was extended to the San Luis Valley.

On April 13, on invitation of Governor Sweet, representative potato growers from all sections of the State met in Denver to perfect the general organization committee for the State. Mr. Thomas Lytle and County Agent Ben H. King represented Montrose, Olathe, and Delta communities. An executive committee for the State was chosen and good progress and enthusiasm were reported from all sections. An organization fund was pledged from the various sections. A campaign manager, Mr. W. S. Hill, of Fort Collins, was selected and other plans were laid, including an extension of time from June 1 to June 30 for closing the campaign.

On June 5 Mr. Walton Peteet, director of cooperative marketing for the American Farm Bureau Federation, gave a splendid exposition of the plan at well-attended meetings at Olathe and Delta. During June Mr. W. S. Hill, organization manager, held enthusiastic mass meetings at Montrose, Olathe, and Delta, which clinched the final success of the campaign in these three districts. While in this section Mr. Hill also met with the Delta bankers and secured



An irrigated field of spuds.

The first move to form a state-wide organization for the cooperative marketing of Colorado potatoes was instituted at Montrose, Colo., on February 10, 1923. Mr. W. F. Heppe, marketing specialist of the Colorado Agricultural College, in conference with the Montrose County agricultural agent a few days previously, had gone over the association agreement and marketing contract being used in the State of Maine under the Sapiro plan and presented it to the executive committee of the Montrose County Farm Bureau, which indorsed it and decided to assist in promoting such a movement. It was likewise indorsed by the board of directors of the Olathe Cooperative Shipping Association, which had successfully marketed a number of cars of potatoes cooperatively the previous year. The cooperative contract was also being considered and indorsed by representative groups of farmers or by marketing associations in Fruita, Carbondale, and three sections of the San Luis Valley.

The campaign was opened in the Montrose district on the closing day of the farmers' institute, February 23, by Mr.

Contracts were offered for signature and about 350 acres were signed. An organization committee was appointed to take charge of the local campaign and arrangements were made to carry the further ex-



An excellent crop when the prices are right.

COOPERATIVE MARKETING OF EGGS IS PROFITABLE.

The farm poultry flock has been made a source of cash income as well as of food for the family by many farm women who have learned from their agricultural extension agents the best methods of poultry management and preparation of products for market. Here is a typical case: A group of farm women, desiring to improve the earnings of their flocks, brought eggs to the weekly meeting of the extension club, where the home demonstration agent showed them how to grade and pack properly for shipment. This was continued each week until the members were able to do the work themselves. They then organized to ship their eggs cooperatively, secured as customer a grocery store in a near-by city, and have been carrying on a satisfactory business for more than a year.

their active cooperation. The campaign was wound up Saturday night, June 30, in a burst of enthusiasm. In the Montrose district 265 signers were secured with 2,700 acres, which was 85 per cent of the acreage of this district. In Olathe district it was 185 signers, 1,725 acres, or about 80 per cent. In the Delta district there were 120 signers, with about 1,000 acres, which was about 63 per cent. In the State as a whole about 65 per cent of the total acreage was secured, or about 75 per cent of the tonnage.

As to some of the methods that were used in this campaign in these three districts: The actual start was made at Montrose and all of the contracts for the State were printed there. A questionnaire covering a full explanation of the plan, in question and answer form, was prepared, printed, and given wide distribution all over the State. For the various meetings, etc., circular letters were prepared and mailed—in all 15 circulars with over 4,500 copies for the three districts. Splendid cooperation was given on the part of the newspapers in the way of reporting progress, notices of meetings, and stories concerning the plan, etc. At Montrose an "acrometer" representing a thermometer to show the acreage being signed from day to day was prepared and posted in a conspicuous store window. After the campaign got under way it didn't take long to put the mercury out of the top of the tube. A list of those signing the contract was prepared on a large strip of canvas and kept posted in a conspicuous place and it was found to attract considerable attention. Without the unfailing support of Mr. W. F. Heppe the campaign would never have been

the success it was. However, the principal credit rests with the various organization committeemen who were actual potato raisers, and who left their work to attend the committee conferences and make the plans and spent considerable time in soliciting signatures to the contract. These are the men who actually put it over; without their support and interest it could not have been done. It was a splendid example of what teamwork will accomplish.

The last chapter in this great movement is quickly written. Trustees from the various associations about the State met in Salida on July 11 and 31 for the purpose of forming the State organization—the Colorado Potato Growers' Exchange—which was done. An executive committee for the State exchange was chosen with three representatives from the San Luis Valley, one from Carbondale, and one from Montrose. Meanwhile the various local associations about the State were incorporated and started getting ready to do business. An effort has been made throughout the entire organization to put the most competent and experienced men available into the various responsible positions, and such has been done. It is one of the principal aims of the organization to keep the quality of the products marketed at the highest possible level. This will be done through close inspection by the associations and education of the membership.

Mr. Ben Gibson, of Monte Vista, was selected as general manager of the exchange, Mr. W. F. Heppe was chosen as director of the field service department, and Weyl-Zuckerman Co. are the sales agency for the first year. Montrose was signally honored in having Thomas Lytle, of this city, chosen as president of the State exchange.

This ends the story of the formation of the biggest cooperative marketing organization ever attempted in the State of Colorado, except for one word more. The exchange has started rolling cars of potatoes, and the returns and prospects are entirely pleasing. The membership is entirely loyal, and new applications for membership are being received daily. The proof of the pudding is in the eating, but the first bite we have had certainly tastes good.

Over 600,000 farm boys and girls were enrolled in agricultural extension clubs in 1922, trying approved methods of crop and live-stock production and farm and home management.

It takes about 6 pounds of grain and 6 pounds of hay to produce a pound of lamb (live weight); 10 pounds of hay and 10 pounds of corn to make a pound of beef; and 5.6 pounds of corn for a pound of pork.

COOPERATION PAYS IN SELLING ALFALFA

That cooperation pays is more than indicated by the results being obtained by the Elephant Butte Alfalfa Growers' Association on the Rio Grande project in New Mexico and Texas.

Last year the association sold about 14,000 tons of hay and this year expects to handle considerably more than 16,000 tons, or market a commodity worth in the neighborhood of \$300,000. Choice alfalfa has advanced to \$20 per ton, and only a negligible tonnage has moved at as low a price as \$14.50 a ton. The cost of production is estimated by one of the leading farmers at \$8.62 per ton, interest on investment included.

Among some of the other advantages received by members of the association of farmers are cost buying of fertilizers and hay ties; prompt, liberal allowances on stored hay; and a protected, orderly market for their product. During the spring of 1923 members of the association bought \$8,000 worth of hay ties, amounting to four carloads or 8,000 bundles. These ties were sold to the farmers at \$1.05 per bundle. Nonmembers pay about \$1.40 per bundle. In addition, 10 carloads of fertilizer were bought and shipped to the members at cost. On these issues of cooperative buying alone the savings were about 25 per cent over local prices.

The sale of automobiles in Idaho in January and February, 1923, was three times the sales in the corresponding months of 1922, according to a chart published recently in the Boise Statesman.

FARMERS ORGANIZE COOPERATIVELY

Four new cooperative organizations were formed recently on the Strawberry Valley project, Utah, namely, the Nebo Cooperative Marketing Association, covering fruit and vegetables; the Nebo Dairy Incorporated, covering butter and cheese; the Utah County Wheat Growers' Association, with branches in Spanish Fork and Payson; and the Utah County Poultry Association, with branches in Springville and Spanish Fork. It is also anticipated that the sugar-beet growers will shortly be organized into a cooperative association.

This demonstrates the present tendency of the farmers on the projects to organize into protective cooperative associations to obtain better marketing facilities and better prices for their products.

DEVELOPMENT OF IRRIGABLE AREA PLANNED FOR FUTURE.

Intensive settlement and home building to be promoted by placing industrial conditions on all projects in order—Industrial agent may be selected under supervision of project manager.

By Miles Cannon, Field Reclamation Commissioner.

THE Bureau of Reclamation proposes to fill every Government project with deserving families and experienced farmers and will use its efforts to assure the development of every irrigated acre upon those projects to its maximum production.

How these plans are to be carried out will be developed in the immediate future. There must be more intensive settlement and cultivation and home building must be promoted. An industrial agent on each project may have to be named from those already employed to guide and help new settlers in getting located and render assistance to those now working on these Government enterprises.

The first thing that occurs to me in studying the reclamation situation is that industrial conditions on the projects must be put in order. The people must be led to know that the Government is trying to cooperate with them—each water user to become a booster for his Government, his State, and his community, and to appreciate what the Government is trying to do for him.

When these things are put into order the next step is to get qualified water users in numbers sufficient to occupy all the available acreage on the project. These I consider are the matters of paramount importance, and I am hoping that my program to this end will bring about success.

The reduction of large landholdings into smaller units to support a number of families is necessary. This will bring about more rapid settlement and as the improved acreage is brought into intensive production, settlement of unimproved lands would follow more rapidly than by concentrating efforts first upon the unreclaimed areas. To this end the industrial agent would work.

Options on these large holdings should be secured and home seekers would deal with a representative of the bureau instead of possibly a land shark or some irresponsible solicitor. Prospective buyers should be furnished with accurate information.

This agent should advise with farmers on markets, tariff rates, shipping, planting, and harvesting methods. He should cooperate with Federal, State, and county agents in the control of pests and the eradication of live-stock diseases.

On every project it is my belief that efforts of the Reclamation Bureau could effectively be turned toward aiding in the establishment of industries, such as canning plants, dairies, creameries, and cheese factories.

The bureau could assist water users in availing themselves of Federal farm loans and other credits when deserved. Closer

cooperation with commercial bodies can be brought about.

Although the plans for settlement have not been worked out, it is proposed to establish a central office to receive inquiries of home seekers from various parts of the country. After they have selected the particular locality they prefer we could then give them definite information regarding lands or crops on this Government project and would direct them how to reach it. After their arrival there the industrial agent under the

project manager will see that they are satisfactorily settled on their new homes. This is tentative, of course, and has not been adopted as a definite plan yet.

Advertising methods to reach home seekers on reclamation projects should also be used. For instance, the Government could place posters in Federal buildings over the United States, at tourist parks, and other prominent places announcing that farms may be secured on projects. These posters would be framed and carry a caption of this character: "Let the Government help you get a home. Irrigated land available in the (name of project)."

This activity should be accomplished with more or less newspaper publicity of an appropriate nature, and feature the wisdom of owning, developing, and living in a home situated in a community with a future.

The general purpose should be to fill each project with deserving families and assure the development of each land unit to its maximum production, which would assist water users to meet construction charges—upon which the Federal reclamation of land largely depends.

The total number of farmers attending agricultural extension meetings of all kinds during 1922 is estimated to be more than 14,000,000.

TO AID FARMERS.

"Another change contemplated by the Bureau of Reclamation is developing the agricultural end of irrigation. Everything so far has been concentrated on construction, which has reached nearly 100 per cent efficiency. Experts say the engineering work of the department is nearly perfect. Not enough attention has been paid to the production end of irrigation. That is the reason for my appointment. My big job is to get settlers on the lands under irrigation and to convince water users on many projects that sometime they are going to have to pay the Government back."—Miles Cannon, Field Reclamation Commissioner.



The well-kept homes of progressive settlers are a delight to the eye.

CROP CONDITIONS ON THE PROJECTS.

The following is a brief summary of crop conditions on the irrigation projects of the Department of the Interior, Bureau of Reclamation, at the end of August:

Yuma project, Arizona-California.—Harvesting of alfalfa seed was about completed and cotton picking had begun. The cotton crop appeared to be excellent, being estimated at three-quarters to 1 bale per acre. Plans were being made to grow winter lettuce to be sold under a cooperative agreement by the farmers.

Orland project, California.—An excellent fourth crop of alfalfa was harvested and harvesting of the almond crop was well under way. Picking of prunes was in progress and a large portion of the crop was being dried at the new dehydrating plant adjacent to the project.

Grand Valley project, Colorado.—The potato crop was practically all marketed at a price ranging from \$1.50 to \$1.75 per hundredweight. The sugar-beet crop was in excellent condition and a good yield is assured. The yield of all important crops will probably average better than ever before. Picking of Elberta peaches was at its height at the end of the month. Prices were fairly satisfactory, but the yield was not up to expectations. Early pears were shipped at a fair price. Prospects for the apple crop were not favorable owing to damage by the codling moth.

Uncompahgre project, Colorado.—All crops generally were in good condition. Good prices were received for shipments of early potatoes, the price ranging around \$1.40 per hundredweight.

Boise project, Idaho.—The second cutting of alfalfa was harvested. The quality was good, but the yield was below normal owing to the alfalfa weevil. Exceptionally good yields of grain were reported and the price was better than anticipated. Potato shipments were heavy at 90 cents to \$1.25 per hundredweight. Harvesting of a heavy crop of prunes had begun and good prices were being received. Apples were ripening early and picking of Jonathans was expected to begin about the middle of September. A large acreage of head lettuce was making good growth.

Minidoka project, Idaho.—Wheat was all cut and much of it threshed. The yield was very good, many fields running from 40 to 60 bushel per acre. The second cutting of alfalfa was completed. The quality of potatoes was good, but the yield was disappointing.

Huntley project, Montana.—Harvesting of sugar beets was expected to begin about September 15. The Great Western Sugar Co. stated that the beet crop is a credit to any section. Other crops generally were very good, especially corn.

Milk River project, Montana.—The second cutting of alfalfa was in progress and showed a good yield where the fields were properly farmed and not damaged by floods. The experimental plats of sugar beets were looking well.

Sun River project, Montana.—The prospect was excellent for good crops throughout the project. Sugar beets were doing well where given proper care. Samples of beets weighing 3 pounds each were taken from some fields in August. Some farmers have tried the Great Northern bean with success.

Lower Yellowstone project, Montana-North Dakota.—Sugar beets were in excellent con-

CROP PRICES, AUGUST, 1923.

Project.	Alfalfa hay, per ton.					
	In stack.	Baled at shipping point.	Barley, per bushel.	Oats, per bushel.	Wheat, per bushel.	Potatoes, per bushel.
Salt River.....	\$8.00	\$13.00	\$0.80	\$0.60	\$1.15	.....
Yuma.....	11.00	15.00	.....	.....	.....	.....
Orland.....	9.00	15.00	.65	.....	.87	.....
Grand Valley.....	10.00	13.00	.....	.50	.85	\$0.70
Uncompahgre.....	8.00	.....	.....	.40	.84	.84
Boise.....	8.00	11.00	.50	.40	.75	.75
King Hill.....	8.00	.....	.....	.....	.....	.....
Minidoka.....	6.00	9.00	.51	.32	.81	.66
Huntley.....	5.00	.....	.....	.....	.....	.....
Milk River.....	10.00	.....	.31	.50	.99	1.80
Sun River.....	7.00	10.00	.55	.60	.95	.90
Lower Yellowstone.....	6.50	.....	.34	.22	1.03	.....
North Platte.....	.....	.....	.....	.....	.....	.....
Newlands.....	8.00	12.50	.72	.56	1.02	1.50
Carlsbad.....	.....	19.50	.....	.....	.....	.....
Rio Grande.....	.....	20.00	.....	.....	.....	.....
Williston.....	15.00	.....	.46	.....	1.10	1.50
Umatilla.....	.....	.....	.....	.....	.....	.....
Klamath.....	10.00	.....	.60	.43	.84	.....
Belle Fourche.....	.....	.....	.40	.30	.85	.....
Strawberry Valley.....	14.00	17.00	.65	.55	1.05	.90
Okanogan.....	15.00	.....	.....	.....	.....	.....
Yakima.....	.....	12-15	.....	.....	.....	.....
Riverton.....	12.00	15.00	.75	.65	.90	.....
Shoshone.....	.....	13.00	.....	.....	.75	.75
Indian projects:	.....	.....	.....	.....	.....	.....
Blackfeet.....	7.50	.....	.27	.32	.92	1.30
Flathead.....	8.00	.....	.....	.....	.87	1.20
Fort Peck.....	10.00	.....	.....	.50	.91	.65

dition. Corn promised a heavy yield. The second cutting of alfalfa was in the stack and most fields will have a fair third cutting. The yield of small grain was disappointing owing to extremely hot weather as the grain was filling. It is believed, however, that this will have a beneficial effect in causing farmers to give up raising grain and to produce more profitable crops.

North Platte project, Nebraska-Wyoming.—Crop yields generally were satisfactory except where damaged by hail. The potato yield was reduced considerably because of blight, but this will be partly compensated by the prevailing fair price. The corn and sugar-beet crops were generally very good. The third cutting of alfalfa was under way. The quality of the hay was impaired owing to the unusually wet season.

Newlands project, Nevada.—Harvesting of "Hearts of Gold" cantaloupes was under way at the end of the month, and carload

shipments began in September. The second cutting of alfalfa gave an excellent yield, in many cases making up for the short first crop. The third crop was making a good growth. Grain was being hauled for storage in bond and shipment.

Carlsbad project, New Mexico.—The third crop of alfalfa was harvested and in some cases a fourth crop was obtained. Practically the entire alfalfa seed crop was threshed, amounting to 380,000 pounds, valued at \$55,000. The cotton crop generally was above the average, although damaged slightly in scattered fields by the boll and leaf worms.

Rio Grande project, New Mexico-Texas.—Approximately 1,600 cars of cantaloupes were shipped from the Mesilla Valley. The yield was fair and the market good, netting a good profit to the growers. Bartlett pear shipments were about completed and shipments of apples were under way. Some localities were being troubled by leaf worm in the cotton.

Umatilla project, Oregon.—Harvesting of the third crop of alfalfa was in progress. Several carloads of melons and cantaloupes were shipped from the Irrigon district. Apples promised well.

Klamath project, Oregon-California.—Cutting of grain and of the second crop of alfalfa had begun. On some of the more favorably located leased lands on Tule Lake large grain yields were anticipated.

Belle Fourche project, South Dakota.—The corn and sugar-beet crops were developing satisfactorily. The second cutting of alfalfa was damaged by rain and it is doubtful if there will be enough good hay in the district to supply the local demand.

Strawberry Valley project, Utah.—The condition of all crops was excellent, especially wheat and hay. The pear crop was being harvested and threshing of grain was in progress with good yields reported.

Okanogan project, Washington.—The fruit crop was in good condition. Prices for early apples were good, but the recent trend of the market was downward. The market for pears showed a slight upward movement.

Yakima project, Washington.—Harvesting of peaches and pears was practically completed and the third cutting of alfalfa had begun.

Shoshone project, Wyoming.—Twenty-one carloads of early potatoes at \$1.35 per hundredweight, f. o. b. cars, were shipped during the month. This is the first time potato shipments have been made in August from this project. Beet dumps were erected at Deaver and Garland by the Great Western Sugar Co., indicating the growth of intensive farming methods. Crops were looking unusually well, and this fact combined with prospects for fair to good prices has produced a more optimistic spirit among the farmers than has prevailed since 1920.

THE WONDERFUL DEVELOPMENT OF THE POULTRY INDUSTRY.

Highlights in the history of the industry, which is valued at a billion and a quarter dollars a year—Make every 100 hens guarantee you not less than 50 eggs a day.

By H. O. Numbers, Secretary Pennsylvania State Poultry Association, Loretto, Pa.

THE fiftieth anniversary convention of the American Poultry Association was held in August in Philadelphia, Pa. Among the many representatives present were men from Cuba, Canada, and England. It will not be long until we will boast an International Poultry Association. The breeders of England and Canada are organized, as are the breeders of the United States. The first poultry show in America was held in Boston, in 1849. There were 119 exhibitors, with 1,443 entries. Ladies were admitted free and men were charged a small fee, amounting to about 8 cents. It is also worthy of note that in many of the States in America and in the Provinces of Canada poultrymen and poultry sympathizers are finding their way to higher positions, where they can be of great benefit to the poultry producers. The State of Illinois is greatly favored by such men. The legislature recently appropriated \$104,000 for the standard breeders of poultry in the State. It was the Queen of the Netherlands who opened the first World's Exhibition of Poultry at The Hague in 1921, and was present at the opening of the first World's Poultry Congress there. The King of Spain is taking an active interest in the second World's Poultry Congress to be held in Barcelona. Our hope is that our own President will look with favor on the industry, and invite the Poultry Congress to convene in America.

These facts will bring to your attention the rapid development of the industry and the favorable consideration extended by influential people. The economic factor of food supply has no doubt exerted an influence in the increased production.

There are more people in America either raising poultry or connected with its various lines than in any other industry.

Prices for poultry products are favorable and conducive to profits by judicious management.

We are frequently asked during the winter months "if our hens are laying any eggs." Oh, yes; we never know a dull season on our plant. But we are constantly on the job, and know how to get eggs when the other fellow is allowing his hens a vacation. We know that for every 100 hens in our pens we are guaranteed not less than 50 eggs per day. You can do the same. There are no dark secrets to be unearthed. No special college training is required to start you on the road to profits. Use what you have to start, and seek the help of your State Department of Agriculture. They want to help you, but they also want you to follow their instructions. You alone

can not afford to experiment. All the methods given you by your agricultural men have been tried and tested.

POULTRY INVESTMENT OVER \$1,000,000,000

Until recent years the back-yard flock, or the "Farmer's Few," represented the general poultry establishment of the United States. But upon realization of the gains by feeding the grain raised on the farm to the fowls, and not selling at sacrifice prices, and by the conversion of by-products and refuse to profits by the hens, poultry farming has become a commercialized industry of more than a billion and a quarter dollars a year.

Poultry products never go hunting a market. Adjacent to every farming center is always a market. The parcel post places you in contact with your customer no matter if he is 200 miles away. You have no excuse for being an "Old Timer" and to follow the same old rut of your ancestors. Modern facilities and Government assistance are at your service. Will you avail yourself of this golden opportunity?

Learn a lesson from the other fellow's failure, and by no means take yourself too seriously.

I recently met a beginner who "knew it all," and the methods used by successful producers were all condemned by him. He was going to bring about an evolution in the poultry industry. No use to offer advice to this man. It was just like "casting pearls before swine." In about six months he will be cured, and financially broke. That is the kind who broadcast to those who will listen that there is nothing in the poultry business, "for he could not make it go."

In deciding on the size of the back-yard poultry flock, two things must be taken into consideration—the space available and the quantity of table scraps available.

It is much harder to raise small chickens in the small space of a back yard than out in the country where there is plenty of grass range.

Grimm alfalfa is superior to the Common in the North, and Peruvian is preferable for the Southwest.



Up to the ears.

PLAN PROPOSED FOR BUILDING PROJECTS BY CONTRACT.

Opening of bids and allotting work to the lowest bidders among private contractors with rigid supervision by Government engineers of the construction may be included in changed policy.

[Copied from the Constructor.]

THE Reclamation Bureau is expected to announce a marked change of policy under which contractors will be allowed to make bids for construction of projects, both large and small, contemplated by that agency.

It is probable this new policy may be placed in effect early next year, so far as a major project is concerned, in connection with construction of the American Falls project in Idaho.

The fact is known that Government officials see in this contemplated policy an opportunity to render a businesslike accounting of the work of the service to the people. As one close student of the situation recently expressed his thought: "There often is a feeling in the public mind that the Government spends more money at times than is necessary in constructing the large reclamation projects itself instead of contracting for the work. How much better it would be for all parties concerned if the whole subject were to be brought into a clean-cut light each time plans are laid for constructing a new project. By giving the contractors an opportunity to bid in on this work, an automatic check and balance would be placed upon the Government's expenditures, the construction industry would be granted a fair play, and the public would be assured that its money was bringing maximum returns."

The point is being emphasized that under conditions where the Government virtually is competing with the construction industry in the building of reclamation projects the net result is a weakening in degree of the economic structure of the country. Observers point out that much instability of the construction industry and many fluctuations of construction material prices might be avoided if the Government work were available as a tide over between periods of comparative inactivity in private building. To furnish a major industry with this stabilizer would be to add stabilization to industrial operations of the Nation as a whole. Restricting consideration of the subject to the effects upon the construction industry alone, it is certain that all general contractors, whether they bid for the reclamation construction or hold themselves to private work, would feel the benefits of addition of a balance to the supply and demand of material and labor.

Precedents for the action under consideration are being plentifully furnished. As pointed out repeatedly by the associated

general contractors, there is no good reason why the Interior Department should handle its construction work in a different manner from that employed by the Treasury, War, and Post Office Departments, the Bureau of Roads, and the Forest Service. All these divisions and agencies of the Government find it feasible to have their work done by contract, and advocates of the plan point to savings that are being effected under this system.

No special action by Congress will be necessary to place the proposed system in effect, the certainty being that sufficient executive authority reposes in the Interior Department officials to enable the new policy to be inaugurated without further search for creative power.

The bureau may carry the new mode of operations to the degree where it would entirely withdraw from the construction field. If the semiofficial view of the subject can be approximated, it appears rather that the present organization and plant of the bureau's construction division will continue to do work where contractors do not underbid the cost figures arrived at by the Government engineers and in cases where local conditions may cause officials to feel the Government can more profitably perform the work, regardless of the relationship between the bids and the bureau's estimates. These latter cases, however, would be few and far between, as they would be based upon conditions so peculiar as to be distinctly out of the ordinary.

YUMA PROJECT BUYS MANY AUTOMOBILES.

During the period from January 1 to July, 1923, there were 42 carloads of automobiles received on the Yuma project, Arizona-California, as compared with only 14 carloads during the same period in 1922.

Investment in automobiles provides a fair index of prosperity, and it would be interesting to have an annual census of these aids to navigation and farm work owned by the water users on the reclamation projects. Judging from the appearance of the streets of project towns on Saturday nights and holidays, it is believed that the per capita average would compare favorably with that of the most congested district in the United States.

The engineering staff of the bureau will continue, under all policies, to hold its present form and numbers, since its work is necessary, if for nothing more than a check by which to gauge the bids received.

The plans call for establishment of a system that will be of absolute fairness to contractors whose bids are considered. No item of cost will be omitted from the Government's calculations that might place the bidders at a disadvantage, according to provisions already in force and under consideration as a part of the general plan. It has been pointed out that every item of administrative expense, covering even the smallest details of operation of the Washington and Denver offices of the bureau goes into the calculations made by the Government engineers, thus giving contractors an assurance that they will not have to compete with incomplete estimates in submitting their bids.

Contemplation of adoption of the new policy does not involve a negative view of the principles and methods under which the work of the bureau has been carried on in the past, impartial observers declare. Rather, they see the new move as a phase of evolution. It is stated, for instance, that conditions in the construction field during the war, with prices of labor and materials showing wide ranges of variation at identical times, might be seen as sufficient license to permit Government officials to adopt the policy of handling projects themselves instead of by contract. With the return of more normal times, it is outlined, the Government finds itself confronted by fewer variables and therefore in position to feel that it can let contracts on a sounder basis. But this phase of evolution, if such it actually is proven by the facts to be, is secondary to the one which involves the question of responsibility of bidders.

The point has been made that the original policy of the Government in handling reclamation work was to do it by the contract method entirely. One official outline of the history on the subject has declared that disappointments encountered in dealing with irresponsible bidders was the main factor in inducing the Government to take up at least portions of the work for itself. Accepting this at face value, then, the fact that change of policy is being considered presents itself as ample proof of existence of an evolutionary action in the official mind, has been impressed by the abilities and desires of contractors generally to hold fast to responsible operations.

MALONE DIVERSION DAM ON KLAMATH PROJECT BUILT.

New structure will divert water for irrigation of 10,000 acres of Oregon land.—Water will be turned into West Canal with the opening of the irrigation season of 1924.

ON the Klamath project, Oregon-California, Government forces have recently completed the construction of Malone Diversion Dam. The dam is located on Lost River, about 10 miles below Clear Lake Reservoir and about 45 miles south-easterly from the city of Klamath Falls, Oreg. The construction of the dam is part of the plan for the irrigation of about 5,800 acres on the west side of Langell Valley and about 4,300 acres in the vicinity of Bonanza, Oreg. Stored water will be released into Lost River from Clear Lake Reservoir and diverted into the west canal at Malone Dam.

The diversion dam consists of an earth embankment with a spillway and canal head-gate structure of reinforced concrete. The spillway and the head-gate structure for the west canal are located on the west side of the river; there is also a small head-gate on

Cost of Malone Diversion Dam.

Item.	Unit.	Quantity.	Cost.	
			Unit.	Total.
Surveys and testing.....				\$1,794.26
Right of way.....				31.25
Clearing.....				63.40
Cofferdams.....				1,896.68
Excavation:				
Class 1, dry.....	Cubic yards.	740	\$1.77	1,314.15
Class 1, wet.....	do.	2,440	1.51	3,681.97
Class 3, wet.....	do.	810	2.11	1,713.77
Class 3, dry.....	do.	85	1.91	1,683.90
Embankment.....	do.	18,500	.72	13,476.25
Puddled back fill.....	do.	3,400	1.56	5,309.36
Concrete reinforced.....	do.	452.5	44.01	19,874.96
Structural steel.....	Pounds.....	145	7.09	1,029.41
Grouted paving.....	Square yards	2,246	5.67	12,738.74
Riprap.....	Cubic yards.	17,000	.163	2,771.22
Gates, etc.....	Pounds.....			6,108.19
Camp maintenance.....				2,058.06
Engineering and inspection.....				5,660.11
Superintendence and accounts.....				5,662.65
General expense.....				
Total.....				86,992.16



Malone dam, Klamath project, Oreg.-Calif.

the east side. The earth embankment is 400 feet long. Its maximum height is 32 feet, the upstream slope is 3 to 1, and the downstream slope 2 to 1. The spillway structure is equipped with two radial gates 10 feet high and 16 feet long. The capacity of the spillway is 4,000 cubic feet per second. The dam will raise the water surface about 18 feet above normal. On the west side of the river the foundation consists of lava bedrock; near the center of the channel the bedrock dips downward. The eastern half of the river channel was underlain with lava boulders and gravel mixed with clay, ash, and cinders. East of the river bed the above materials were covered to a depth of about 6 feet with a black mucky material, which was composed largely of vegetable matter; this was removed before placing the material for the embankment. The principal quantities are: Embankment, 18,500 cubic yards; reinforced concrete, 452

cubic yards; and riprap, 1,732 cubic yards. The work was begun in July, 1922, and completed in May, 1923.

The water at the site was about 8 feet deep. Cofferdams consisting of juniper trees and earth were constructed above and below the dam site. The river water was by-passed through a small timber flume; the flow amounted to only a few cubic feet per second. Little difficulty was experienced in removing the water between the cofferdams. The excavation of the mucky material in the river bed was done with a stiff-leg derrick operating a clamshell bucket. The excavation for the spillway and head-gate structures was done principally by teams and slip scrapers.

In building the embankment about 3,500 cubic yards were placed with fresno scrapers and 15,000 cubic yards with dump wagons. The average length of haul for the fresnos was about 300 feet and for the dump wagons

about 1,000 feet. The dump wagons were loaded by fresno scrapers through an overhead trap. The dump wagons had a capacity of 2 cubic yards; about 40 trips were made per day. The earth was spread in 6-inch layers and was well sprinkled and rolled with a heavy corrugated roller. The embankment was completed on October 31, 1922.

Concreting was begun in October, 1922, and completed in May, 1923. The concrete materials were placed on the hillside about 20 feet above the crest of the dam. The mixer was placed about midway between the concrete materials and the spillway structure. A trestle was built from the mixer to the forms; the concrete was partly wheeled and partly chuted into place. About one-half of the total yardage was placed during freezing weather. During cold weather the mixing water was

(Continued on page 286.)

RECLAMATION-PROJECT WOMEN AND THEIR INTERESTS.

Summer camps for girls teach self-reliance and unselfishness—He carried water for the elephants, but was too tired to see the show—Serving trays made at home.

The Girl Reserves of El Paso, Tex., Rio Grande project, early in the season established at Cloudercroft, a local mountain retreat, a No Man's Land, where for a limited period they hiked, camped, and cooked in the midst of tall trees and invigorating atmosphere. Every 10 girls had a counselor, so that the outing was well supervised, and a recreation director helped the girls plan games and amusements for the cool evenings around the camp fires, as well as for daytime when hiking and horseback riding were popular.

All over the country there are now well-organized summer camps for girls as well as boys, but these privately conducted camps are much too expensive for the average family. Women's organizations can quite profitably forego some of their splendid programs to devote a little time to arranging such an outing for the local girls and boys, too, if they are not already otherwise provided for.

These camps make girls self-reliant, and their environment eliminates the old-fashioned clinging-vine variety, substituting in their place vigorous young girls who are perfectly able to take care of themselves. Outdoor life cultivates not only self-reliance, but an appreciation of Nature, for woodcraft and campcraft are taught. Birds, flowers, and trees are all studied, a music counselor directs camp-fire singing, and most important of all the girls learn how to live with other people.

The irregularity of the summer hotel where girls arise at dawn some days and

sleep until noon the next is lacking in camp life, for the feature of activity there is regularity. Every day is filled with things

FEED THE FAMILY AND SELL THE SURPLUS

Looks like a big problem is about to be solved, not only for the farmer and his wife, whose alarm steadily has been growing over the increasing exodus of their young folks to the city, but for the social economists who see in the abandoned farms of certain sections the crumbling of the very foundations of rural life. The boys' and girls' club work is fast bringing the young people to the soil, but the young are not the only people who turn longing eyes to the advantages of city life.

North Carolina has staged a "Live at Home" campaign, a vigorous revival of interest in gardening, poultry, dairying, etc., both to feed the family and sell the surplus. Everyone from the governor to the mill hands is cooperating. City folks have planted back lots; farmers have increased their gardens and bought pure-bred stock; mill hands have been given the use of vacant plots free. The campaign, tied up with nutrition, beautification, and other phases of home economics work, has already turned thousands of houses into homes.

to keep the girls going from morning until evening if they like, although of course there is plenty of time for them to do the many things that suit them personally.

Summer camping teaches unselfishness and thoughtfulness of others. The girls find out it is not what they are used to at home that counts then; it is what they have within themselves that shows.

WATERING THE ELEPHANT.

Years ago I heard the story of a poor boy who wanted to go to the circus, but had no money. So he got a job carrying water to the elephants to pay for his admission. All day long he trudged back and forth in the broiling sun with big buckets of water. When it came time for the evening performance he was so tired that he fairly crawled to a seat. The next he knew a big man was tapping him on the shoulder, and amid the noise and confusion of workmen tearing down the seats he heard: "Wake up, son; the show is over." He had done his work faithfully and had earned the pleasure, but he had missed the show.

How many hundreds of thousands of women there are who are wasting their lives "carrying water to the elephants." It is just a little different kind of elephant, that's all. In their case it happens to be perhaps a poorly arranged kitchen, inefficient equipment, no water in the house, scrub poultry, etc., and in nearly every case a never-ending round of monotony. All these things sap strength, waste energy, and fail to pay in any kind of coin. At the end of a lifetime of this kind of work we wake up; the show is over; we have missed the real pleasures of life and have nothing to show for our efforts. As Omar so beautifully expressed it—

"The soul's dark cottage, battered and decayed,
Lies in new light through chinks which time has made."

The sad part of it all is that in most cases it is absolutely useless. So many agencies are now working to lighten the burdens of farmers and their wives that for methods of acquiring almost every desirable thing under the sun one has only to ask. Practically every one of the Government departments has something of value to offer; agricultural colleges in most of the States have masses of material from which to choose; and many manufacturing concerns and other organizations are waiting for requests to furnish valuable information to lighten our labors.

Learning by experience is too slow a method, and while the schools are providing

(Continued on page 287.)

(Continued from page 285.)

heated and after pouring the concrete was protected by firing.

The channel leading to the spillway structure was paved with a grouted paving. The upstream face of the dam is protected with riprap 18 inches in thickness. The downstream side is protected with riprap about halfway up; the upper half of the downstream face is protected with large sized crushed rock.

Rock for concrete was crushed on the job. Rock for the crusher and for riprap and paving was obtained from two quarries, one about 200 feet and one about 2,000 feet from the dam. Sand was shipped in from Marysville, Calif. The sand, cement, reinforcing steel, metal work, timber, all equipment, and supplies were hauled in by motor truck from Dairy, Oreg., a distance of about 27 miles. Contract hauling was at the rate of 23 to 30 cents per ton-mile.

The principal equipment used on the job was as follows: 1 stiff-leg derrick, 72-foot boom; 1 concrete mixer, 10 cubic feet; 1 hoist, reversible, 6-horsepower, gasoline; 1 jaw crusher, 10 by 22 inches; 1 air compressor, 9 by 8 inches; 2 Fordson tractors; 2 air drills; 2 centrifugal pumps, 4 and 8 inches; 1 clamshell bucket (rented); 5 dump wagons (rented).

Common labor was paid \$3.60 to \$4.50 per day; more-skilled labor, \$4.50 to \$5; carpenters, \$7. Horses were rented at \$20 each per month, the United States furnishing subsistence.

The job was always short of men and the turnover was high.

Under more favorable labor conditions the cost could have been reduced below that shown in the tabulation.

It is expected that water will be regularly diverted into the west canal with the opening of the irrigation season of 1924.

INTERIOR DEPARTMENT DRIES UP A LAKE.

THE Department of the Interior has changed the map again. In its reclamation work it is constantly altering the face of nature. It has changed vacant desert into thickly settled farm country, it has diverted one river into another, it has created great lakes as storage reservoirs. And now, as if to placate Mother Nature by a compensating change, it has reversed the process and dried up a natural lake.

Get out your map and put your finger on the Klamath country in southern Oregon and northern California. Athwart the interstate line you will find indicated a sizable body of water called Tule Lake measuring 120 to 150 square miles in area—75,000 to 100,000 acres—according to the date and accuracy of your map.

You can now draw your red pencil through that lake. It has lost its main source of supply owing to the operations of the Reclamation Bureau and has given up its accumulated waters by evaporation. In other words, it has literally vanished in thin air.

When the department began operations in the Klamath country years ago, it took soundings of Tule Lake which showed that the lake bed sloped gently from the northern shore to the south where a water depth of 25 or 30 feet existed. The lake has no visible outlet and plans were made to throttle its inlet, Lost River. A channel was cut from Lost River to Klamath River, wasting surplus water to the sea. Storage reservoirs were planned upstream, flooding land small in extent and agricultural value compared to the beautifully sloping Tule

Lake bed. Thus the natural water supply for Tule Lake is not only held back and evaporated but provides stored water for irrigation of lands along Lost River and in the exposed lake bed. Some of the water reaches Tule Lake bed, but instead of coming in excess to form a lake comes down as needed for irrigation. Nature is controlled; lake bed and water are made to serve man.

But not all of the 75,000 acres lake bottom can be cultivated. The lake will in all likelihood reappear in diminished size in the spring. Not all its water source can be put in a strait-jacket. Local rains and freshet flow will not yet answer man's command. So the lake has fluctuated with the seasons, gradually giving ground to man's advance in the form of bed land permanently exposed until a point is reached beyond which man dare not encroach with his cultivation and irrigation.

With caution against a flareback due to a "wet" year the department has followed the receding waters down the gentle slope of the uncovered land. A strip of 5,800 acres was opened to settlement in 1917, another of 10,000 in 1922. Additional land has been leased for grain production without risking home building until the waters have passed beyond danger. Eventually the reclamation of 30,000 acres once under water is confidently predicted. The future will fix the final limit. Maybe 40,000 or 50,000 acres in all will some day be occupied as irrigated farms by veterans of the World War, who have a preferred right to the reclaimed lands.

STOPS WATER POLLUTION BY BATHING IN CANALS

Swimming in the canals by water users resulting in the pollution of the waters has been forbidden on the Grand Valley project, Colorado, by its manager after a discussion of the matter at a recent meeting of the board of directors of the water users' association.

The project manager issued instructions to abate this nuisance in the early part of July. His order on the subject follows in full:

"Complaint has been made by some of the water users that many people, both from the project and the towns, are in the habit of swimming in the main canal.

"You are hereby instructed to put a stop to this practice as far as possible, and to warn all persons found swimming or bathing in the canal or laterals, or otherwise polluting the water, that they are violating the State laws. Each ditch rider will report to his foreman the names of all persons who persist in swimming in spite of his warnings, and the foreman will send the names to the project office."

BE A BOOSTER.

Boost and the world boosts with you;
Knock and you're on the shelf;
For the booster gets sick of the man
who kicks
And wishes he'd kick himself.

Boost when the sun is shining;
Boost when it starts to rain;
If you happen to fall, don't lie there
and bawl,
But get up and boost again.

(Continued from page 286.)

for the future of your daughters you have but to reach out and gather in the rich fruits of the experiments of a vast throng who have worked out the solution to most of your problems.

HOMEMADE SERVING TRAYS.

Not everyone can afford the dainty and useful tea wagons offered by furniture stores, but the homemade article will save just as many steps and is really more serviceable for the busy woman. Any man who is handy with simple tools can make one, and if you have a boy who is taking manual training you are lucky indeed, for the tea wagon is the same as yours.

In a Virginia home recently a very successful wheel tray was made out of an old washstand, utilizing the large drawer, the top, the framework, and other parts. To roll such a tray around conveniently swivel casters may be provided from some discarded piece of furniture, small swivel wheels, or the small wheels of a baby carriage or toy wagon.

A wheel tray saves many steps between the dining room and kitchen, both in serving and in clearing away meals, especially in large households, where many dishes must be handled. The top and shelf spaces are sufficient to carry all dishes to the table in one trip or to remove them from it after the meal. Steps are saved by it in serving refreshments to a caller or on other social occasions. It is invaluable for use in the sick room. When well made such a tray is attractive as well as useful, and may serve as a reading table, smoking table, or flower stand. It may be stained dark or enameled white to harmonize with the dining room and its furnishings. The space in the top may be used to keep dishes in, and the drawer will store silver and table linen.

The Department of Agriculture recommends the dimensions given below for making a convenient serving tray which will go through doorways without danger of bumping. The upper part of the tray is box shaped, 16 inches wide and 26 inches long. The box part, or china compartment, is 4½ inches deep. This is supported by four

legs 1½ by 1½ inches, which measure 31 inches from the floor to the top of the tray. It is best to edge the top of the tray or the lid of the china compartment by a molding 1½ inches wide to prevent dishes from slipping off. The inside of the china compartment is painted white even if the outside of the tray is dark. On the side of this compartment are little screw hooks on which cups may be hung. There is space in the compartment for serving dishes for six.

Below this serving compartment is a drawer 2 inches deep, which is divided into two parts. One side is used for linen and one for silver. The side used for silver is lined with dark-colored felt or outing flannel.

In the space below the drawer a large undershelf is fitted. It should be edged with molding 1½ inches wide, so that soiled dishes may be safely placed on it. One handle may be put on instead of two for pulling or pushing the loaded tray about. These handles may be made from old broomsticks.

FROM A LEGAL STANDPOINT.

BY special act the Legislature of Arkansas established a drainage district, authorized the construction of drainage works, and empowered a drainage board to levy an annual tax upon the land and the railroad tracks within the district, not to exceed 6 per cent of the assessed valuation. For the year 1918 the board assessed a tax of \$7,346.12. Of this, 57 per cent was levied upon the railroads and 43 per cent upon the 12,000 acres of land within the district. The land was not under cultivation but would become much more valuable immediately upon being drained. The railroads, being constructed upon a fill above flood level, would receive no direct benefit. Claiming that these facts amounted to an arbitrary discrimination which denied them the equal protection of the laws, the railroads brought suit to restrain enforcement of the tax. The United States Supreme Court sustained the position of the railroads in *Thomas v. Kansas City Southern Ry.* (Adv. Ops. 475, Sup. Ct. Rep. 440.)

Where surplus water is delivered to a landowner outside of an irrigation district in Idaho, when the same is not required for lands within such district, such landowner does not acquire a vested right to such waters within the meaning of Section 4, article 15, of the constitution of Idaho, or section 5638, Compiled Statutes, and is not entitled to the delivery of such water when the same is required for the irrigation of lands within the district. An irrigation district, organized under the provisions of the statute

acquiring an irrigation system, is under no legal obligation to continue to deliver water to persons who have theretofore used the same but who have not acquired a vested right to the use of such water. (*Yaden v. Gem Irr. Dist.* (Idaho), 216 Pac. 250.)

The construction, operation, and maintenance of waterworks, gas works, and light-

"DAMNUM ABSQUE INJURIA."

A prominent sportsman from San Francisco had been hunting ducks on the Standish farm, and old man Standish had him arrested for trespassing. A lawyer from San Francisco came down to the small village of Alviso to represent the hunter, a jury trial having been requested. During the course of the trial the attorney several times used the expression "Damnum absque injuria." One of the jurymen, an old farmer around Alviso for many years, arose and with his face aflame with rage addressed the justice of the peace:

"Jedge, once he said it, and me and Martin, Trevey, and Nickolson says nothin'. Twice he said it, and me, Martin, Trevey, and Nickolson don't like it. The third time now he's said it, and we ain't goin' to hear it no more. No young feller like him that's standin' over there is goin' to tell us that we are a damn poor jury in that highflutin' language no more."

ing plants by a city for the benefit and convenience of its inhabitants constitute the exercise of private and proprietary powers. Likewise an irrigation district, in constructing its irrigation system, exercises a private or proprietary power. Such district derives all its power from the statute under or by which it is created, and one dealing with the district is charged with notice of the extent of its powers and limitations and restrictions on the exercise thereof. A grant of power, the exercise of which is restricted and limited to a specific mode, excludes the exercise thereof in any other manner. (*Toohy Bros. Co. v. Ochoco Irr. Dist.*, 216 Pac. 189.)

District Counsel Darwin G. Tyree of the Portland office has resigned from the Bureau of Reclamation, effective October 1, 1923, to accept a more lucrative position.

Mr. Tyree has been in the employ of the Government since 1915 with the exception of a period of military service during the World War. He entered the Federal service as an inexperienced clerk and left as a lawyer with an unusually good record.

He has proved himself to be a gentleman of high character, industrious at his work, and faithful to his obligations. His law work has been particularly meritorious and effective.

Under the provisions of section 4350, Idaho Compiled Statutes, the legal title to all property acquired by an irrigation district by operation of law vests immediately in the district and is held in trust for, dedicated to, and set apart to the use and purposes provided by law. (*Yaden v. Gem Irr. Dist.* (Idaho), 216 Pac. 250.)



Almost an essential on every farm.

NOTES FROM RECLAMATION PROJECTS.

Excess lands on the Yuma project in Arizona and California are to be sold. The water users have listed them with a real estate firm on the Pacific coast and they are being advertised.

At a mass meeting of the water users of the Garland Division, Shoshone Project, Wyoming, plans have been approved and have been submitted to the Secretary of the Interior for the settlement of the repayment problem.

The best crop of cherries in the history of the Yakima reclamation project was grown this year. The 1923 yield has been estimated to have brought \$523,000 into the coffers of the farmers and water users of the Yakima Valley in the State of Washington.

Several projects have reported difficulty on the part of farmers to secure adequate help in harvesting the crops. There is also a scarcity of labor on a number of the projects where day laborers are needed.

Representatives of the Federal Government, the State of Montana, and the Canadian Government met at Great Falls on August 31 to devise ways and means of controlling the grasshopper pest. A committee was appointed to carry out the suggestions made at the conference.

Representatives of a beet-sugar company recently investigated the possibilities of increased sugar-beet acreage on the Lower Yellowstone project with a view to the feasibility of erecting a sugar factory on the project.

Officials of the Elephant Butte irrigation district, Rio Grande project, are promoting the construction of a secondary dam below Elephant Butte for the purpose of making it possible to operate a primary power plant at Elephant Butte continuously throughout the year.

The Carlsbad project reported a yield of 22,764 pounds of alfalfa seed from 25 acres, which sold for \$3,186.96. In addition, the threshed straw amounted to approximately 1 ton per acre, valued at \$15 per ton if held until the winter season.

NOT SO BAD!

Five farms in the Otis and near-Carlsbad districts, Carlsbad project, New Mexico, containing a total of 566 acres, all in crops and well improved, were sold recently to Arkansas buyers for \$77,850. The prices paid were: 130 acres, at \$200, \$26,000; 115 acres, at \$150, \$17,250; 40 acres, at \$165, \$6,600; 80 acres, at \$75, \$6,000; 60 acres, \$10,000; and 141 acres, \$12,000.

The Hermiston Commercial Club, Umatilla project, has been taking considerable interest in diversified farming and in cooperation with the settlers, and planned to arrange a caravan of project settlers to visit lands near Kennewick, Wash., where diversification is being successfully practiced.

Extensive improvements are being made to railroad trackage in the yards at Delta and Montrose, Uncompahgre project, and additional side tracks are being constructed. A wider ballasted roadbed is being graded; and it is probable that the broad gauge will be extended from Montrose to Cedar Creek, which will do away with the transfer from the narrow gauge to the broad gauge at Montrose of shipments coming from that section.

The Burley Flour Mill, Minidoka project, has completed enlargements to a capacity of 800 barrels per day and is building a second concrete grain storage tank to hold 44,000 bushels.

A prize was awarded to Mr. Lee Moor, of the El Paso Valley, Rio Grande project, for the first bale of this season's cotton, picked in June.

A settlement committee has been formed recently on the Newlands project, Nevada, composed of Messrs. C. G. Swingle, True Vencill, and B. S. Holmes, and Project Manager Richardson. The purpose of the committee is to cooperate with other bodies in an endeavor to get good settlers on the Newlands project.

(Continued on page 290.)



Herds of pure-bred dairy cows are found on every project, but more are needed.

COMMISSIONER DAVIS INSPECTING PROJECTS

Commissioner David W. Davis, of the Bureau of Reclamation, left Washington, D. C., on September 8 for an official trip to the field, in general including the irrigation projects north of the Union Pacific system. The first reclamation stop was at Walcott, Wyo., on the 11th, to see the proposed Saratoga project. Subsequent points included American Falls, Boise, Spokane, Columbia Basin, and Yakima projects.

Chief Counsel Hamele accompanied the commissioner as far as American Falls and then visited Denver and Helena before returning to Washington. Chief Engineer Weymouth joined the party at Walcott, Wyo., and with Field Reclamation Commissioner Cannon, who joined the party at American Falls, participated in the remainder of the itinerary.

After returning to Washington about October 10, Commissioner Davis plans to leave again for the West, visiting a number of projects not included in the first trip.

(Continued from page 289.)

A new four-stand cotton gin has been erected at Malaga, Carlsbad project, and a new hull house at the cottonseed mill at Loving.

Definite approval has been given to the construction of the Natron cut-off, which will put Klamath Falls on the main line of the railroad.

The Ronan Community Club, Flathead (Indian) project, has started an active campaign to bring in new farmers.

During August, 24 carloads of potatoes were shipped from the Shoshone project. Growers realized an average cash return of \$1.25 per hundredweight. At the close of the month the price had dropped to 90 cents per hundredweight, but shipments continued heavy.

Settlers on reclamation projects should cultivate the reading of bulletins published by the Department of Agriculture dealing with every phase of farming. These bulletins are furnished upon request and are the best authority on the cultivating of every variety of crops prepared by experts.

For the first time the Bureau of Reclamation is going to give an accounting of its stewardship to the water users, through the fact-finding commission appointed by Secretary of the Interior Work.

FEED WHEAT TO STOCK WHEN PRICES ARE LOW

WHEAT is a good feed for live stock and when certain ratios exist between the prices of corn and wheat the latter can be fed with as good results as are obtained by feeding corn if proper methods are followed.

Based on digestible nutrients, wheat and corn are practically equal pound for pounds but corn and corn products alone make a better feed for cattle than wheat and wheat products alone. It is not necessary to grind corn as a hog feed, but wheat should be coarsely ground or crushed. Wheat may take the place of corn in rations for dairy cows. It is figured that a bushel of wheat is about equal in feeding value to a bushel of corn, so that in cases where the farm value of corn is only slightly less than that of wheat and where the farmer has surplus wheat but does not have corn, it may pay him to feed wheat, since he will save haulage. Wheat does not give the best results when fed alone to poultry, but should be mixed with corn. Wheat for horses should be ground or preferably rolled, and must be mixed with other feeds because of its sticky qualities and because if fed alone, it may cause digestive troubles.

The accompanying table showing the relative prices at which wheat can be used as feed has been prepared, covering the entire range of prices at which these grains are likely to sell in the near future. By reference to the table it is figured, for example, that when corn is 75 cents a bushel on the farm, 80-cent wheat can be fed profitably to all animals including poultry; 84-cent wheat to cattle and hogs but not for

ONE ORCHARD PRODUCES 40 CARLOADS OF APPLES

Forty carloads of apples will be shipped this season from the orchard of E. C. Crappe, on the Rio Grande project, New Mexico and Texas. Five hundred and four crates are loaded into each car, making a total of 20,160 crates of apples from this one orchard of 120 acres.

The orchard contains 6,000 trees, 2,000 of which are 12 years old and the balance are of various ages, none having reached full bearing age. Jonathan and Banana apples are the principal varieties in the orchard.

sheep and poultry; whereas 92-cent wheat is profitable for beef cattle only. It should be kept in mind that the cost of grinding or crushing has not been considered.

Corn prices per bushel (56 pounds of shelled corn) and equivalent wheat prices per bushel (60 pounds) based on their relative feeding value for several kinds of farm animals.

Kind of stock.....	Poultry and sheep.	Hogs.	Beef cattle.
Percentage relation of wheat to corn in feeding value.....	100	100	105
Grain.....	Corn.	Wheat.	Wheat.
	Cents.	Cents.	Cents.
	50	54	56
	55	59	62
	60	64	67
	65	70	73
	70	75	79
	75	80	84
	80	86	90
	85	91	96
	90	96	101
	95	102	107
	100	107	112
Prices per bushel....			
	62	65	68
	68	71	74
	74	77	80
	80	83	86
	86	89	92
	92	95	98
	98	101	104
	104	107	110
	110	113	116
	116	119	122



Settlers looking for a cash crop grow sugar beets where this is feasible.

CROP REPORT, BELLE FOURCHE PROJECT, SOUTH DAKOTA, 1922.

Crop.	Area (acres.)	Unit of yield.	Yields.		Values.		
			Total.	Average (per acre).	Per unit of yield.	Total.	Per acre.
Alfalfa hay.....	28,965	Ton.....	48,460	1.67	\$5.00	\$242,430	\$8.37
Alfalfa seed.....	883	Bushel.....	739	.84	9.80	7,242	8.21
Barley.....	1,284	do.....	25,511	19.9	4.45	11,480	8.94
Beans.....	3	do.....	50	16.7	2.40	120	40.00
Beets, sugar.....	324	Ton.....	3,145	9.7	5.00	15,725	48.60
Clover seed, sweet.....	95	Bushel.....	200	2.1	9.00	1,800	18.94
Clover hay, sweet.....	214	Ton.....	212	.99	5.00	1,070	5.00
Corn.....	7,130	Bushel.....	177,720	25	.56	99,526	11.94
Corn fodder.....	103	Ton.....	219	2.1	10.00	2,190	21.25
Flax seed.....	19	Bushel.....	80	4.2	2.50	200	10.53
Garden.....	171					11,280	65.93
Hay, grain.....	500	Ton.....	148	.72	5.00	740	3.67
Hay, native.....	2,388	do.....	2,401	1	7.00	16,807	7.00
Oats.....	5,050	Bushel.....	133,261	26	.32	42,643	8.44
Pasture, alfalfa.....	5,230				7.00	36,617	7.00
Potatoes.....	311	Bushel.....	30,271	97	.60	18,162	58.40
Wheat.....	5,482	do.....	85,288	15.5	.90	76,759	14.00
Miscellaneous.....	29					999	34.45
Less duplicated areas.....	966						
Total cropped.....	56,920	Total and average.....				585,770	10.28
		Areas.....	Acres.		Farms.....	Per cent of project.	
		Total irrigable area farms reported.....	72,748		1,035	95	
		Total irrigated area farms reported.....	31,150		444	40	
		Under water right applications.....	31,113		948	40	
		Under rental contracts (Warren Act).....	87		1		
		Total cropped area farms reported.....	56,920		949	74	

CROP REPORT, STRAWBERRY VALLEY PROJECT, UTAH, 1922.

Crop.	Area (acres.)	Unit of yield.	Yields.		Values.		
			Total.	Average (per acre).	Per unit of yield.	Total.	Per acre.
Alfalfa.....	11,970	Ton.....	35,895	3	\$7.76	\$278,610	\$23
Apples.....	62	Pound.....	25,025	403	.093	2,327	37
Barley.....	525	Bushel.....	19,609	37	.76	14,980	29
Beans, string.....	6	Tons.....	27	4.5	45.00	1,215	202
Beans.....	51	Bushel.....	594	11.7	4.50	2,667	53
Beets, sugar.....	4,160	Ton.....	46,615	11.2	5.75	268,034	64
Berries.....	1.75	Pound.....	4,330	2,470	.074	325	186
Clover hay.....	147	Ton.....	302	2	7.40	2,227	16
Clover seed.....	108	Bushel.....	426	3.9	5.00	2,130	19
Corn, Indian.....	591	do.....	10,660	36	.50	5,317	18
Corn, ensilage.....	219	Ton.....	2,219	10.1	6.00	14,281	65
Cabbage.....	2	Pound.....	8,000	4,000	.03	240	120
Cherries.....	29	do.....	240,000	8,276	.07	16,800	579
Garden.....	217					15,586	72
Hay.....	635	Tons.....	1,460	2.2	8.00	11,473	17
Grapes.....	12	Pound.....	12,000	24,000	.10	1,200	2,400
Melons.....	23					1,442	63
Onions.....	12	Bushel.....	1,987	165	.75	1,490	125
Oats.....	1,246	do.....	50,646	41	.57	29,031	23
Orchard.....	138					3,628	26
Pasture.....	2,490					13,080	6
Peaches.....	121	Pound.....	711,565	5,881	.0115	8,183	67
Peas.....	77	Ton.....	124		42	5,208	67
Potatoes.....	572	Bushel.....	79,706	133	.22	18,024	31
Potatoes, sweet.....	2	do.....	300	150	1.50	450	225
Prunes.....	1	Pound.....	11,000	11,000	.01	110	110
Rye.....	17.75	Bushel.....	525	30	.85	446	25
Tomatoes.....	33	do.....	14,933	453	.276	4,115	125
Wheat.....	6,884	do.....	199,920	29	.85	169,931	25
Waste and failure.....	267						
Total cropped.....	30,340	Total and average.....				892,550	30
Summer fallow.....	305						
Young alfalfa.....	105						
Nonbearing orchard.....	70						
Total irrigated.....	30,820	Areas.....	Acres.		Farms.....	Per cent of project.	
		Total irrigable area farms reported.....	33,400		2,400	100	
		Total irrigated area farms reported.....	30,820			95	
		Under water right applications (private).....	25,000			75	
		Under rental contracts (special).....	8,600			25	
		Total cropped area farms reported.....	30,340		2,400	93	

MONTHLY CONDITIONS OF PRINCIPAL BUREAU OF RECLAMATION RESERVOIRS FOR AUGUST, 1923.

[Elevation above sea level.]

State and project.	Reservoir.	Available capacity in acre-feet.	Elevation.		Storage in acre-feet.			Out-flow in acre-feet.	Elevation of water surface.		
			Spill-way crest. ¹	Lowest gate sill. ²	Beginning of month.	End of month.	Maximum.		Beginning of month.	End of month.	Maximum.
Arizona, Salt River.....	Roosevelt ³	1,575,000	2128.1	1924.6	432,433	396,052	432,433	36,381	2077.73	2073.47	2077.73
California, Orland.....	East Park.....	51,000	1199.68	1111.68	24,450	10,850	24,450	12,900	1181.98	1166.8	1181.98
Idaho:											
Boise.....	Arrowrock.....	280,000	3211	2956	212,250	91,020	212,250	184,990	3187.3	3127.2	3187.3
	Deer Flat.....	177,000	2518	2488	112,153	59,239	112,153	58,084	2510.55	2502.88	2510.55
Minidoka.....	Lake Wolcott.....	95,180	4245	4236	109,710	82,410	109,710	344,916	4246.19	4243.9	4246.19
	Jackson Lake.....	847,000	6769	6728	586,240	303,330	586,240	342,608	6758.4	6745.89	6758.4
Montana:											
Milk River.....	Nelson.....	70,000	2223	2200	31,000	42,000	42,000	366	2213.84	2316.95	2316.95
St. Marys storage.....	Sherburne.....	66,000	4788	4720	44,440	31,740	45,250		4773.9	4763.8	4774.5
Sun River.....	Willow Creek.....	16,700	4130	4085	14,693	12,209	14,693	2,970	4127.9	4125.3	4127.9
Nebraska-Wyoming, North Platte.....	Pathfinder.....	1,070,000	5852	5670	981,030	792,220	981,030		5847.94	5438.07	5847.94
	Lake Alice.....	11,400	4182	4159	10,000	5,300	10,900		4180.2	4172.9	4181.4
	Lake Minatare.....	60,760	4125	4074	52,800	50,000	52,800		4121.2	4119.8	4121.2
Nevada, Newlands.....	Lake Tahoe.....	120,000	6224	6224				29,672	6227.21	6228.82	6227.21
	Lahontan.....	273,600	4162	4060	214,500	167,380	214,500	54,372	4155.4	4148.8	4155.4
New Mexico:											
Carlsbad.....	McMillan.....	45,000	3267.7	3241.6		1,000	5,500	11,500	3253.1	3254.3	3257.7
Rio Grande.....	Elephant Butte.....	2,638,000	4407	4231.5	1,412,346	1,343,313	1,412,346	116,736	4370.2	4367.4	4370.2
Oregon, Umatilla.....	Cold Springs.....	50,000	621.5	560	33,600	18,950	33,600	13,151	609.57	596.01	609.57
Oregon-California, Klamath.....	Clear Lake.....	462,000	4540	4514	353,000	332,000	352,000		4535.8	4535.7	4535.7
South Dakota, Belle Fourche.....	Belle Fourche.....	203,000	2975	2920	167,340	172,380	172,380	8,718	2970.2	2970.9	2970.9
Utah, Strawberry Valley.....	Strawberry.....	250,000	7597	7517	227,800	224,800	258,600	13,000	7556.3	7554.5	7559
Washington:											
Okanogan.....	Conconully.....	14,400	2200	2232	7,036	3,697	7,036	4,171	2272.1	2261.7	2272.1
Yakima.....	Bumping Lake.....	34,000	5439	5389	38,670	24,447	38,670	14,193	3429.7	3418.45	3429.7
	Lake Cle Elum.....	20,800	2134	2122	25,510	10,086	25,510	15,424	2134.66	2127.57	2134.66
	Lake Kachess.....	210,000	2258	2192	182,820	124,287	182,820	58,533	2249.16	2234.33	2249.16
	Lake Keechelus.....	152,000	2515	2425	144,160	51,793	144,160	92,367	2511.58	2494.65	2511.58
Wyoming, Shoshone.....	Shoshone.....	456,600	5360	5132.3	461,291	423,385	461,291	77,390	5360.7	5354.9	5360.7

¹ Or maximum storage.² Or zero storage.³ Zero water depth at elevation 1902.2.⁴ Amount of silt shown by silt survey deducted from original capacity.⁵ Proposed regulation.⁶ Estimated low-water limit under proposed plan of regulation.⁷ Elevation of reservoir raised 12 inches by stop logs in spillway.

COMPARISON BETWEEN OPERATION AND MAINTENANCE ESTIMATES AND RESULTS, JANUARY 1 TO AUGUST 31, 1923.

Project.	Gross cost.				Net accruals and revenues.				Area paying charges.
	Estimate for 1923.		Actual cost to Aug. 31.	Amount * over or under estimate.	Estimate for 1923.		Actual returns to Aug. 31.	Amount more or * less than estimate.	
	Total for year.	To Aug. 31.			Total for year.	To Aug. 31.			
UNDER PUBLIC NOTICE.									
Belle Fourche.....	\$70,000	\$52,500	\$44,884	\$7,616	\$72,000	\$47,800	\$11,209	* \$36,591	A cres. 72,448
Boise.....	290,000	207,000	166,121	40,879	241,492	210,000	211,000	1,000	161,500
Carlsbad.....	40,000	28,500	26,470	2,030	55,550	47,000	46,700	* 300	25,000
Huntley.....	41,000	30,000	27,541	2,459	42,000	35,000	22,321	* 12,679	21,800
King Hill.....	33,515	26,000	15,880	10,120	133,515	24,861	25,760		10,000
Klamath-Tule Lake.....	12,400	7,900	4,315	3,585	12,443	11,670	2,600	* 9,070	9,920
Klamath-Main.....	55,000	45,240	47,050	* 1,810	55,647	51,700	48,800	* 2,900	42,105
Lower Yellowstone.....	40,000	31,000	30,500	500	130,741	25,000	19,500	* 5,500	46,000
Minidoka-South side.....	94,000	66,177	59,910	6,267	99,300	79,425	76,900	* 2,525	48,000
Newlands.....	111,400	77,889	82,876	* 4,987	114,000	96,120	97,735	1,615	67,741
Williston.....	32,900	(²)	(²)	(²)	102,167	(²)	(²)	(²)	7,653
North Platte-Interstate.....	175,000	127,000	121,238	5,762	151,000	120,000	120,000		110,000
North Platte-Northport.....	24,000	16,500	18,729	* 2,229	124,000	18,729	18,729		15,000
Okanogan.....	52,200	40,844	34,016	6,828	54,100	52,350	43,400	* 8,950	6,918
Orland.....	33,000	24,300	23,720		33,618	27,400	27,000	* 400	20,174
Rio Grande.....	222,000	152,000	138,400	13,600	1250,000	138,400	138,400		140,500
Shoshone.....	66,000	44,300	42,000	2,300	66,000	60,300	59,000	* 1,300	58,700
Strawberry Valley.....	* 25,000	15,800	15,000		449,200	33,000	36,000	3,000	46,846
Sun River-Fort Shaw.....	11,100	9,300	9,630	* 330	11,500	10,900	10,000	* 900	10,100
Uncompahgre.....	135,000	96,000	103,645	* 7,645	144,500	121,500	125,000	3,500	90,000
Umatilla.....	37,225	26,900	28,000	* 1,100	137,225	33,505	33,000	* 505	24,592
Yakima-Sunnyside.....	145,000	96,845	85,988	10,857	150,767	113,000	115,000	2,000	97,205
Yakima-Tieton.....	96,000	60,000	61,900	* 1,900	89,500	79,850	73,900	* 6,050	32,000
Yuma.....	290,000	200,000	232,000	* 32,000	292,500	207,000	242,000	35,000	63,200
Total.....	2,131,740	1,481,995	1,419,813	62,182	2,212,765	1,644,510	1,603,854	* 40,656	1,227,402
UNDER WATER RENTAL.									
Grand Valley.....	50,000	34,000	27,500	6,500	51,300	41,000	38,000	* 3,000	20,000
Milk River (including St. Mary).....	69,000	50,929	48,022	2,907	18,600	17,310	12,540	* 4,770	45,170
North Platte-Fort Laramie.....	90,000	65,000	48,059	16,941	180,000	48,059	48,059		48,000
Sun River-Greenfields.....	22,000	16,500	13,983	2,517	22,100	20,000	3,615	* 16,385	18,000
Total.....	231,000	166,429	137,564	28,865	182,000	126,369	102,214	* 24,155	129,170
INDIAN.									
Blackfeet.....	30,000	23,000	17,144	5,856	16,400	16,400	1,404	* 14,996	20,900
Flathead.....	55,000	44,000	38,787	5,213	54,500	48,000	23,056	* 24,944	35,000
Fort Peck.....	15,450	10,900	9,684	1,216	1,100	1,100	2,280	1,180	1,100
Total.....	100,450	77,900	65,615	12,285	72,000	65,500	26,740	* 38,760	57,000

¹ Returns regulated by district contracts.² Not received in time for publication.³ Not including repairs.⁴ Includes installment of \$25,000 for tunnel repairs.

ADMINISTRATIVE ORGANIZATION OF THE BUREAU OF RECLAMATION.

DEPARTMENT OF THE INTERIOR.

HON. HUBERT WORK, Secretary of the Interior.
EDWARD C. FINNEY, First Assistant Secretary.
FRANCIS M. GOODWIN, Assistant Secretary.
JOHN H. EDWARDS, Solicitor for the Interior Department.
EBERT K. BURLEW, Administrative Assistant to the Secretary.
JOHN H. MCNEELY, Assistant to the Secretary.
JOHN HARVEY, Chief Clerk.

BUREAU OF RECLAMATION.

WASHINGTON, D. C.

David W. Davis, commissioner; Miles Cannon, field reclamation commissioner; Morris Bien, assistant commissioner; Ottamar Hamele, chief counsel; J. B. Beadle, commissioner's assistant; C. J. Blanchard, statistician; Hugh A. Brown, editor and office assistant; C. A. Bissell, engineer; J. M. Luney, chief accountant; C. A. Lyman, repayment accounting; Miss H. A. Fellows and Raymond Depue, fiscal agents; C. H. Fitch, chief clerk; G. W. Numbers, appointment clerk; H. N. Bickel, Yakima, Wash., and W. F. Kubach, Denver, Colo., examiners of accounts.

DENVER, COLO.

F. E. Weymouth, chief engineer, Wilda Building, Denver, Colo.; R. F. Walter and C. P. Williams, assistant chief engineers; Miss L. H. Meisel, secretary to the chief engineer; J. M. Gaylord, electrical engineer; J. L. Savage, designing engineer; James Munn, engineer, W. A. Meyer, chief clerk; A. McD. Brooks, purchasing agent; Harry Caden, fiscal agent.

PROJECT ORGANIZATION.

Belle Fourche Project.—B. E. Hayden, project manager, Newell, S. Dak.; R. C. Walber, chief clerk.
Boise Project.—J. B. Bond, project manager, Boise, Idaho; Walter Ward, engineer in charge construction Black Canyon Dam; E. R. Mills, chief clerk; C. F. Weinkauff, fiscal agent.

Carlsbad Project.—L. E. Foster, project manager; Carlsbad, N. Mex.; V. L. Minter, chief clerk and fiscal agent.

Grand Valley Project.—S. O. Harper, project manager, Grand Junction, Colo.; W. J. Chiesman, chief clerk.

Huntley Project.—A. R. McGinness, project manager, Ballantine, Mont.; H. S. Elliott, chief clerk; Miss M. C. Simek, fiscal agent.

King Hill Project.—George Harris, acting project manager, King Hill, Idaho; T. W. Hause, chief clerk.

Klamath Project.—H. D. Newell, project manager, Klamath Falls, Oreg.; N. G. Wheeler, chief clerk; G. R. Barnhart, fiscal agent.

Lower Yellowstone Project.—H. A. Parker, project manager, Savage, Mont.; E. R. Scheppelmann, chief clerk.

Milk River Project.—G. E. Stratton, project manager, Malta, Mont.; E. E. Chabot, chief clerk; G. S. Moore, fiscal agent.

Minidoka Project.—Barry Dibble, project manager, Burley, Idaho; Dana Templin, engineer; E. C. Diehl, chief clerk; Miss A. J. Larson, fiscal agent; F. A. Banks, engineer, American Falls, Idaho.

Newlands Project.—J. F. Richardson, project manager, Fallon, Nev.; A. W. Walker, engineer; G. B. Snow, chief clerk; Miss Ethel M. Simmonds, fiscal agent.

North Dakota Pumping Project.—W. S. Arthur, project manager and chief clerk, Williston, N. Dak.; H. C. Melaas, fiscal agent.

North Platte Project.—Andrew Weiss, project manager, Mitchell, Nebr.; H. W. Bashore, engineer, Fort Laramie Division; T. W. Parry, irrigation manager; J. R. Ummel, chief clerk; Mrs. A. L. Truax, fiscal agent.

Okanogan Project.—Calvin Casteel, project manager, Okanogan, Wash.; W. D. Funk, chief clerk and fiscal agent.

Orland Project.—R. C. E. Weber, project manager, Orland, Calif.; E. T. Eriksen, engineer; C. H. Lillingston, chief clerk and fiscal agent.

Rio Grande Project.—L. M. Lawson, project manager, El Paso, Tex.; C. A. Peavey, chief clerk; L. S. Kennicott, fiscal agent.

Riverton Project.—H. D. Comstock, project manager, Riverton, Wyo.; L. H. Mitchell, engineer; R. B. Smith, chief clerk; W. J. Fogarty, fiscal agent.

St. Mary Storage Division.—R. M. Snell, project manager, Browning, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Salt River Project.—Being operated by the Salt River Valley Water Users' Association; C. C. Cragin, general superintendent and chief engineer, Phoenix, Ariz.

Shoshone Project.—J. S. Longwell, project manager, Powell, Wyo.; J. R. Iakisch, engineer; C. M. Jump, superintendent of irrigation; W. F. Sha, chief clerk; Miss L. C. Drinkwater, fiscal agent.

Strawberry Valley Project.—W. L. Whittemore, project manager, Provo, Utah; H. R. Pasewalk, chief clerk; W. C. Berger, fiscal agent.

Sun River Project.—G. O. Sanford, project manager, Great Falls, Mont.; H. W. Johnson, chief clerk; F. C. Lewis, fiscal agent; G. A. Benjamin, irrigation manager, Fairfield, Mont.

Umatilla Project.—H. M. Schilling, project manager, Hermiston, Oreg.; R. M. Conner, engineer in

charge construction McKay Dam; G. C. Patterson, chief clerk and fiscal agent.

Uncompahgre Project.—L. J. Foster, project manager, Montrose, Colo.; G. H. Bolt, chief clerk; F. D. Helm, fiscal agent.

Yakima Project.—J. L. Lytel, project manager, Yakima, Wash.; R. K. Cunningham, chief clerk; J. C. Gawler, fiscal agent; M. D. Scroggs, superintendent of irrigation, Sunnyside, Wash.; J. S. Moore, superintendent of irrigation, Route 6, Yakima, Wash.; F. T. Crowe, engineer in charge construction Tieton Dam, Rimrock, Wash.; C. F. Gleason and W. C. Christopher, engineers; V. G. Evans, chief clerk; E. V. Hillius, fiscal agent.

Yuma Project.—P. J. Preston, project manager, Yuma, Ariz.; R. M. Priest, superintendent of construction; D. C. McConaughy, engineer, Yuma Mesa Division; D. C. Caylor, superintendent of irrigation; C. A. Denman, chief clerk; E. M. Philebaum, fiscal agent.

INDIAN PROJECTS.

Blackfeet Project.—R. M. Snell, project manager, Browning, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Flathead Project.—C. J. Moody, project manager, St. Ignatius, Mont.; S. A. Kerr, engineer in charge construction Hubbard Dam; J. M. Swan, chief clerk; J. P. Siebenelcher, fiscal agent.

Fort Peck Project.—E. L. Decker, acting project manager, Poplar, Mont.; Henry Berryhill, chief clerk and fiscal agent.

FIELD LEGAL OFFICES.

Boise, Idaho.—B. E. Stoutemyer, district counsel. Projects: Boise, Minidoka, King Hill, and Jackson Lake Enlargement.

Denver, Colo.—Law section office of chief engineer; R. M. Patrick and Armand Offutt, district counsel.

Las Cruces, N. Mex.—Mark B. Thompson, attorney. Projects: Rio Grande, Carlsbad, and Hondo.

Helena, Mont.—E. E. Roddis, district counsel, Helena, Mont. Projects: Blackfeet, Flathead, Fort Peck, Huntley, Milk River, St. Mary Storage, Sun River, North Dakota Pumping, Lower Yellowstone, and Shoshone.

Mitchell, Nebr.—J. N. Beardslee, district counsel. Projects: North Platte, Belle Fourche, and Riverton.

Montrose, Colo.—J. R. Alexander, district counsel. Projects: Grand Valley, Uncompahgre, and Strawberry Valley.

Portland, Oreg.—H. L. Holgate and D. G. Tyree, district counsel, Post Office Building. Projects: Yakima, Okanogan, Umatilla, Klamath, and Baker.

San Francisco, Calif.—P. W. Dent and Brooks Fullerton, district counsel, 349 Pacific Building. Projects: Salt River, Yuma, Orland, and Newlands.

WHAT THE SERVICE STANDS FOR.

“UNDER the provisions of the reclamation act the relations of the Secretary of the Interior to your activities and your duties are peculiarly close and intimate. We are members of a great organization engaged in an important creative work. It is my earnest desire to exercise the duties imposed upon me in a manner which will promote the hearty cooperation of all who are devoting their lives to this task.

“I know that the Nation owes much to the pioneers who have wrested an empire from the western arid wastes, for I have lived among them. Their accomplishments have contributed largely to our national wealth and to the stability of our institutions, and their personality has broadened the vision of a people.

“In so far as authority is granted me, I shall gladly extend the services and sympathy of this department in the problems looking toward their advancement.”

HUBERT WORK,
Secretary of the Interior.

TIME HAS ARRIVED FOR STUDY
OF RECLAMATION SITUATION

“IT IS realized by all that the time has now arrived when there should be a general study of conditions on the reclamation projects and a readjustment of payments in the light of present conditions in a manner to enable the industrious and well-meaning settler to meet his obligations at all times and to place these enterprises on a basis of permanent prosperity. Such provisions should be made in the near future, the legislation above referred to being merely temporary in its relief.”—

FRANK W. MONDELL,

Former Majority Leader of House of Representatives

and at present Member of the War Finance Corporation

in speech before House, March 3, 1923

The Reclamation Record

Vol. 14

OCTOBER, 1923

No. 10



The fertile fields flame in russet and gold

TABLE OF CONTENTS

	<i>Page</i>
<i>Take care of mothers</i>	293
<i>Three dams of the Bureau of Reclamation</i>	294
<i>Special advisors begin their investigation</i>	295
<i>Rio Grande claims before a tribunal</i>	296
<i>Credit</i>	296
<i>Commissioner Davis declines to serve</i>	296
<i>Pro and con of crop rotation</i>	297
<i>Organic matter essential on irrigation farms</i>	298
<i>Growing and marketing Hearts of Gold cantaloupe</i>	299
<i>Community advertising for Rio Grande project</i>	300
<i>\$6,000,000 crop from Rio Grande project</i>	300
<i>Cash awards given on various farm activities</i>	301
<i>Project fairs attract attention</i>	301
<i>Reclamation project women and their interests</i>	302
<i>Poultry for the holiday season</i>	303
<i>Irrigation district operation and finance</i>	303
<i>Notes from reclamation projects</i>	304
<i>Melons grow large in this district</i>	305
<i>Cow wins first honors</i>	305
<i>Commissioner Davis advocates dairying</i>	305
<i>Purebred dairy stock now in good demand</i>	305
<i>According to Blackstone</i>	306
<i>Corn crop on Yakima project</i>	306
<i>Crop conditions on the projects</i>	307
<i>Jack rabbit upsets eagle's plan for meal</i>	308
<i>Crop prices, September, 1923</i>	308
<i>Monthly conditions of principal Bureau of Reclamation reservoirs for September, 1923</i>	308

THE RECLAMATION RECORD is sent, without direct charge, to the water users on the irrigation projects of the Bureau of Reclamation. To other than water users the price is 75 cents per year, payable in advance. Subscriptions should be sent to the Chief Clerk, Bureau of Reclamation, Washington, D. C., and remittances (postal money order or New York draft) should be made payable to the Special Fiscal Agent, Bureau of Reclamation. Postage stamps will not be accepted.

TAKE CARE OF MOTHERS

OF COURSE, the Government wants the money it lends for development by reclamation, without interest, paid back in a reasonable time.

Of course, officers and employees of the Reclamation Service want to give good service and hold their jobs.

But after all is said and done, the fundamental purpose of reclamation is to provide comfortable homes, where wholesome children may grow up, from which good citizens may be made.

It is from the farms that cities recruit men to manage their big affairs. History has proven that. Home environment should be made the important feature of reclamation. This must be accomplished indirectly.

Electricity on many projects is used for raising water for irrigation. It should be put in every home to light it; turn the washing machine, the wringer, the churn, the sewing machine; and heat the flatiron. The mother lends inspiration to the family. Why wear her out prematurely? My boyhood recollection of the farm mothers I grew up among is that they were always tired and that many of them were stepmothers, also.

The first concern of the Bureau of Reclamation should be the mothers on projects; and through them, the homes, the children, and the schools, on to the Government.

—HUBERT WORK.



ELEPHANT BUTTE DAM

RIO GRANDE PROJECT

NEW MEXICO - TEXAS

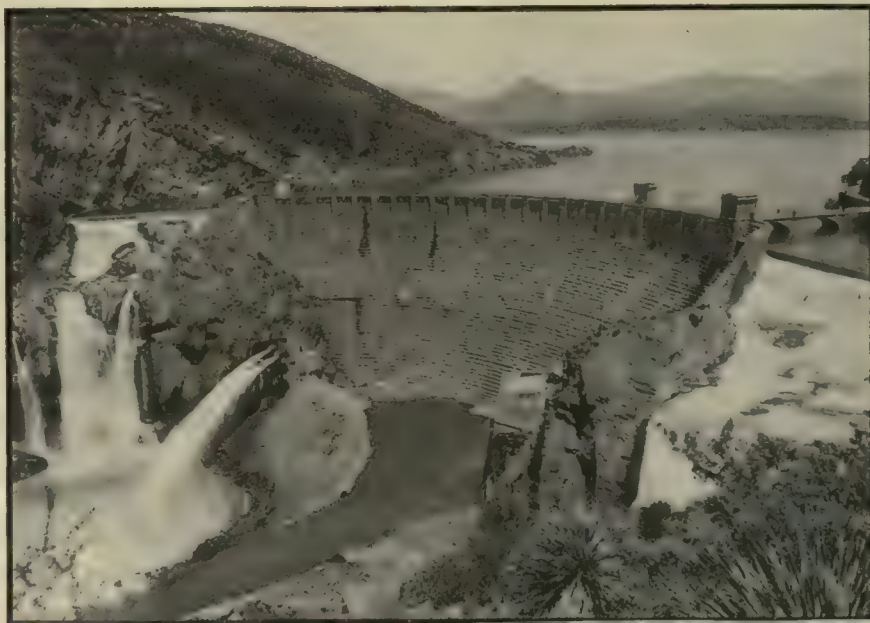


ARROWROCK DAM

BOISE PROJECT

IDAHO

ROOSEVELT DAM
SALT RIVER PROJECT
ARIZONA



THE RECLAMATION RECORD

Issued monthly by the Department of the Interior, Bureau of Reclamation, Washington, D. C.

HUBERT WORK
Secretary of the Interior

DAVID W. DAVIS
Commissioner, Bureau of Reclamation

Vol. 14

OCTOBER, 1923

No. 10

SPECIAL ADVISORS BEGIN THEIR INVESTIGATION

Secretary of the Interior Work opens initial session with declaration that farmers must be protected from loss of their homes—Members begin exhaustive inquiry into every phase of Government reclamation.

THE Special Advisor's Committee appointed by Secretary of the Interior Work to investigate governmental policies and methods of reclaiming lands went into session on October 15 in the Interior Department building at Washington.

A suite of offices had been provided for the committee and the members began at once their exhaustive inquiry into the financial and physical features of the 28 projects that have been constructed by the Reclamation Bureau. The committee is composed of the following:

President Julius Barnes, of the United States Chamber of Commerce, Washington, D. C.

James R. Garfield, former Secretary of the Interior, Cleveland, Ohio.

Former Governor Thomas E. Campbell, of Arizona, Phoenix, Ariz.

Dr. John A. Widtsoe, former president of the State University and State Agricultural College of Utah, Salt Lake City, Utah.

President Oscar F. Bradfute, of the American Farm Bureau Federation, Xenia, Ohio.

Hon. Clyde E. Dawson, Denver, Colo., authority on irrigation law.

Elwood Mead, a noted authority on reclamation and irrigation, Berkeley, Calif.

Secretary of the Interior Work opened the initial session of the committee with a statement in which he declared that it appeared that nearly all the projects were in such a condition that some radical reforms or improvements must be made if they were to be saved and the farmers protected from the loss of their homes. The statement in full follows:

"Soon after I was called upon to act as Secretary of the Interior, in March, 1923, my attention was particularly directed to conditions relating to the reclamation projects constructed or being constructed by the department in the Western States and among which I have lived for 35 years.

"Through complaints from organizations of water users, individual water users, reports of agents, inspectors, official records of the department and Congress, it appeared that

THE PERSONNEL

JAMES R. GARFIELD, of Cleveland, Ohio, Secretary of the Interior in the Cabinet of President Roosevelt, who is thoroughly familiar with reclamation problems;

Thomas E. Campbell, of Phoenix, Ariz., former Governor of Arizona, and chairman of the Colorado River Basin Project, 1921;

Elwood Mead, of Berkeley, Calif., engineer, member of American Society of Civil Engineers and British Institute of Civil Engineers; engineer of Wyoming, 1888-89; chief of irrigation and drainage investigations United States Department of Agriculture, 1897; chairman State rivers and water supply commission, Victoria, Australia, 1907-1915; consulting engineer for various irrigation works; and author of articles on irrigation and engineering subjects;

Oscar E. Bradfute, of Xenia, Ohio, president American Farm Bureau Federation and of Ohio Farm Bureau Federation; member of the board of control of Ohio Agricultural Experiment Station;

Julius H. Barnes, of Duluth Minn., president United States Chamber of Commerce;

Dr. John A. Widtsoe, of Salt Lake City, Utah, director Utah Experiment Station, 1900-1905; president Agricultural College of Utah, 1907-1916; president of International Dry Farming Congress, 1912; and author of articles on dry farming and irrigation subjects;

Clyde C. Dawson, of Denver, Colo., lawyer, who has given much attention to irrigation law and irrigation subjects.

nearly all of the projects were in such condition that some radical reforms or improvements must be had if they were to be saved, farmers protected from loss of their homes,

and the return of the money advanced by the Government for their construction and maintenance was to be secured.

"The complaints and criticisms cover a variety of points too numerous to be described here, but included charges that in many of the projects the original estimates under which settlers were induced to go upon the projects were from 50 to 100 per cent too low and that the actual cost has been so great that it is impossible for the farmers to pay out within the time and manner fixed by law, or even at all; that mistakes, engineering and otherwise, had been made which added materially to the cost of constructed projects; that others had been undertaken that should never have been started; that the overhead costs of the service and many of the individual projects, all borne by water users, were burdensome and excessive.

"Under the system used in the Reclamation Service I have been unable to get figures that appear to be dependable as to the cost of individual projects or the total money expended on all projects.

"It is represented, taken from the records of the bureau, that the Government's total investment to June 30, 1923, in round numbers is \$181,000,000, and its total receipts about \$46,000,000, leaving a balance invested and unpaid of \$135,000,000.

"The Reclamation Service, for which this department is responsible, apparently requires reorganization. Annual reports on some projects indicate their insolvency and pending failure. Out of the 28 projects only one has met its obligations as they fell due. Long extensions of time for payments due are being urged individually and by projects. The original 20-year period for payment is expiring on certain projects and an additional 20-year extension is being asked. In one instance such extension is to be preceded by a five-year moratorium.

"Reclamation of arid lands by irrigation from Government funds as heretofore practiced is failing on a majority of projects as

(Continued on page 296.)

RIO GRANDE CLAIMS BEFORE A TRIBUNAL

The American and British Claims Arbitration, an international tribunal, will hold a hearing in London on November 5 to consider claims growing out of the construction of the Rio Grande reclamation project in Texas and Mexico by the Reclamation Bureau of the Interior Department.

The claims, running into several million dollars, represent alleged damages suffered by British capitalists, who attempted to develop irrigation along the Rio Grande in Texas and Mexico some years before the Federal Government took up the project. Later, after its construction by the United States, they charged that the Reclamation Service of the United States was responsible for their failure and had wrongfully deprived them of their rights. Claims were filed before the American and British Claim Arbitration Tribunal, in which they asked damages ranging from \$3,000,000 to \$5,000,000, the exact amount to be fixed.

The State Department represents the United States in denying the equity of the claims and at the hearing will present written briefs and arguments against granting them. Sir William Wilcox, a British irrigation engineer, is expected to give oral testimony in behalf of the British subjects, and the United States will have a witness to give testimony in rebuttal.

More than 88,500 farmers in 1922 attended meetings on farms where crops or live stock were being grown under the direction of the agricultural extension agents.

(Continued from page 295.)

a business procedure and must be promptly readjusted as to methods of reimbursement for funds appropriated and for the purpose of securing to the settler a permanent home.

"Your committee is requested to survey the whole subject in its entirety; give to the bureau your opinions concerning our operating methods that we may avoid errors, and finally your recommendations which Congress may study and which should ultimately preserve the sanctity of contract, secure to farmers safety for their investments already made, and insure a return of invested funds. I want to improve and extend the service in every way possible, and solicit your suggestions and recommendations.

"Government reclamation has accomplished much. There is a great field for its future. Reclamation in the West by private enterprise was begun 30 years before the Government began this work and has largely redeemed the West. Government reclamation should make a comparable showing, relieved, as it is, from

CREDIT.

In modern business relations, CREDIT is synonymous with CONFIDENCE.

It signifies our trust in our country, our community, and our fellow man.

It is founded on the other fellow's ability to pay; but, primarily, it implies his INTENTION to pay.

If each of us suddenly were to assume the rôle of Shylock and demand full and immediate payment, the charmed circle around which credit travels would be broken and financial panic would result. Our greed would destroy us. We would reap as we sow.

In primitive society credit is unknown; but to-day, because of the interchange of confidence and the stable conditions prevailing in our country, credit is common in all of man's business relations with man.

The farmer, the merchant, the manufacturer, the banker, the physician, the lawyer—all rely upon this bulwark of trade for their very existence.

But rarely do governments, themselves great borrowers, extend credit to their citizens.

A notable exception, however, is found in our own Government's reclamation policy. It is a monument to credit, an expression of a nation's confidence in its people, a veritable testimonial to the native resourcefulness which has resulted in the upbuilding of America.

Reclamation stands for Industry, Integrity, and Confidence.

interest charges, which is the basis of calculation in all enterprises employing private capital. I am anxious that a policy may be developed that will safeguard the future of Government reclamation, which is my only concern in this inquiry.

"This sets up the tenor of complaints that have come into this department since I have been in it. It is a very important activity of the Government. It has so much, and there is so much for it to do, that it seemed to me that it required more than the initiative of one man to determine it. And I have asked you men who have been familiar with reclamation for many years, and have come from different parts of the country as well, to advise and suggest a policy that will put it on a firm foundation, and suggest new methods if any are necessary for our guidance.

"We have prepared rooms down here for your convenience, and it is not expected that you can spend all of your time, all of you. It is hoped that some of you can stay here rather continuously to direct the work of the committee, and we stand ready with

COMMISSIONER DAVIS DECLINES TO SERVE

D. W. Davis, Commissioner of the Reclamation Bureau, has withdrawn as a member of the Special Advisors' Committee recently appointed by Secretary of the Interior Work to investigate Government policies and methods of reclaiming arid and semiarid lands.

In declining to serve on the Special Advisors' Committee, Commissioner Davis stated that he believed himself disqualified because of his position as head of the Reclamation Bureau. In his letter to Secretary Work he said:

"I desire to bring to your attention certain reasons why it seems to me I should not serve as a member of the Fact-Finding Committee on Federal irrigation.

"It is contemplated that this committee will investigate generally the problems of national irrigation. Such investigation naturally will cover not only the acts of former heads of the Reclamation Service but also my acts as Commissioner of the Bureau of Reclamation. The committee might desire to make recommendations contrary to policies I am approving. On the other hand, it might desire to approve policies initiated by me. In either case, it seems to me, my presence on the committee might cause some embarrassment.

"I have such a personal interest in the matter that under the ordinary rules applicable to such cases it seems to me I would be disqualified. I feel that the problems of the Bureau of Reclamation are in need of all my time and attention in my capacity as head of the bureau. Because of matters enumerated I most respectfully ask to be relieved from service on the committee."

Secretary Work stated he has acceded to the withdrawal of Commissioner Davis from the committee.

our employees and our personnel of the service to assist you in every way, in the way of giving you testimony or furnishing you records or information that you may desire.

"Your method of work and your policy of prosecuting it, of course, will be wholly for you to determine. I have no suggestions or advice to give in the matter. Of course I stand subject to call, as any of the other members of the staff are; but I want the whole matter to be studied and reviewed by you independent of everything except what is good for the service.

"I believe that is all that I have to say to you now. We stand ready to furnish you with anything that you may wish in your studies."

At its opening meeting former Governor Thomas E. Campbell was elected chairman of the committee and Dr. John A. Widtsoe was named as the secretary.

PRO AND CON OF CROP ROTATION ON IRRIGATED LANDS

The farmer who has several different crop products to sell each year is better insured against being crippled financially than the one who depends wholly on a single crop.

THE distributors of garden seeds often give "directions for planting" on the back of the seed packets, as pointed out by Mr. C. S. Scofield, agriculturist in charge of Western Irrigation Agriculture. These directions say: "Plant this seed in rich, warm, mellow soil as soon as the danger of frost is past." In much the same spirit the agricultural evangelist exhorts the farmer to "rotate" or "diversify" his crops. This is good, safe agricultural doctrine. It can not possibly do much harm and it may do some good. Obviously there are limits beyond which even the most ardent advocate of crop rotation would pause. And yet somewhere short of that limit there may be a place where his creed is sound.

To begin with we may eliminate from consideration such crops as the deciduous and citrus fruits, and even grapes and asparagus. These are all important crops on irrigated land, but they do not lend themselves to an ideal crop rotation system. They are perennials.

For the most part the rotation system has to do with annual crops, such as cotton, sugar beets, potatoes, and the small grains, though alfalfa, a perennial, and the clovers, which are biennial, are included in most well-balanced rotations.

It may be necessary to admit finally that a rotation of crops is a good thing to use, at least in some places, but before doing so it should be made clear that it has certain disadvantages as compared with a one-crop system.

In the first place a man who confines his attention to a single crop may in a few years if he puts his mind to it, learn how to produce that crop. If he divides his interest among several crops, the chances are that he will never really know any of them well. Each crop has special requirements, special diseases, and special insect pests. And it takes time and study to understand these and to learn how to meet or overcome them.

Furthermore, a man who devotes himself to one crop needs less in the way of farm equipment and machinery than the man who attempts to produce five or six different crops. And also the one-crop farmer has an occasional breathing spell from his labor, while the man having several different crops to look after is scarcely finished with one crop before another demands his whole time and attention.

But the final point is the most important one. In any rotation system that can be suggested some of the crops are certain to be less profitable than others. This being the case, it is only natural to leave out the less profitable crops and to use the available

land and labor for the crops that promise the best returns.

The advocates of crop rotation urge their case on three grounds. It is claimed that a proper system of crop rotation insures better crop yields than can be obtained from the continuous production of the same crop on the same land, that such a system provides a better distribution of the labor requirement throughout the season, and that the fluctuations of market prices for crop products are likely to be less disastrous for the man who has several different crops to sell than for the man who has only one crop.

ELEMENT OF RISK SHOULD BE REDUCED

Success or failure in farming is largely influenced by other things than the system of cropping. For some men success in farming means making enough money from the farm to be able to live somewhere else a part of the year or after a few years of continuous farming. For others the successful farm is one that provides the place for and the means to support a home and family with the element of risk reduced to the lowest possible point, says C. S. Scofield.

The man who undertakes by farming to make as much money as possible in the shortest time is little interested in crop rotation or in crop diversification. He prefers to take long chances in the hope of winning.

It is chiefly to the man who looks to farming as a fairly certain means of making a living that the problems of crop rotation appeal. To him they are interesting and important. They constitute a part of the game.

There is abundant evidence that certain crops do better when grown in rotation with other crops than when grown year after year on the same land. The increases in yield resulting from rotation differ greatly with different crops and with different localities, but almost without exception there is some increase in yield resulting from rotation.

The reasons for such increases are probably very different from the different crops and the different regions. It is sometimes said that the production of the same crop on the same land year after year exhausts the fertility of the soil. This may be true in some cases.

Some crop plants are subject to injury from plant diseases or insect pests that live over from one season to the next in the soil. With such crops continuous production on the same land affords conditions favorable to the plant disease or insect pest and unfavorable to the crop.

Finally, a system of crop rotation that includes alfalfa or clover appears to be essential for maintaining yields of such crops as cotton, potatoes, or sugar beets on irrigated land. This is particularly true where farm manure is not available. In fact, even where farm manure is available it is generally cheaper and more satisfactory to use alfalfa or clover in rotation with such intertilled crops as those mentioned than to depend upon farm manure alone. This is particularly true in view of the fact that supplies of farm manure are obtainable only where farm animals are kept, and the feeding of farm animals usually requires the production of alfalfa or clover.

Turning now to the distribution of labor as affected by the cropping system, it may be observed that there are two sides to that question. Unquestionably a well-planned system of crop rotation makes for a more uniform distribution of the labor requirements of the farm than a single-crop system. The farmer who wishes to keep himself continuously employed throughout the crop season will naturally seek to diversify his crops and adopt some kind of a rotation system. On the other hand, the farmer who dislikes the idea of continuous employment will just as naturally restrict the diversity of his crops in order to obtain as much freedom from labor as possible.

In the matter of avoiding the disastrous effects of price fluctuations, the situation is more complicated. The lessons of experience appear to be that the farmer who has several different crop products to sell each year is better insured against being crippled financially than the one who depends wholly on a single crop. On the other hand, the one-crop farmer may occasionally make more money than his neighbor with several crops.

One hundred pounds of milk, testing 4 per cent, will make about 4.8 pounds of butter, 11 pounds of Cheddar cheese, forty-five 15-ounce cans of condensed milk, 12.5 pounds of whole-milk powder, 8.5 pounds of Swiss cheese, or 23 pounds of Camembert cheese. A number of by-products are also formed by the different processes.

ORGANIC MATTER ESSENTIAL ON IRRIGATED FARMS.

The irrigated farm can be made a paying proposition only when the soil is kept at its maximum fertility. Leguminous crops grown in proper rotation point the way.

"IRRIGATION is an added expense in our farming operations," said Dr. F. B. Linfield, of the University of Montana, recently. In addition to the capital cost for ditch construction in getting the water to the farm there is an annual charge to be met for the following items:

1. Maintenance of main supply ditches and laterals.

2. Cultivated land has to be leveled each year.

3. Farm ditches have to be run.

4. The water must be spread over the land.

5. If irrigated by the flooding system, ditches have to be filled in before harvest.

The yearly cost of these items in Montana varies from \$3 to \$6 per acre for general farm crops and is in addition to the regular farm operations. Another factor that adds to the expense of the irrigated farm is that the fields are usually small, and they always cost more to cultivate. The important point to consider is that this extra cost must be paid for by extra crop returns if we are to compete successfully on the irrigated farm with those who farm without irrigation.

Our western soils where irrigation is necessary are generally fertile and have nearly always an abundance of mineral plant foods. These soils have never been leached. Because of the light rainfall, however, the soils are frequently low in organic matter and nitrogen. Many observations and tests have convinced us that we must build up and maintain the organic matter of the soil if we are to get the maximum returns from the irrigated farms.

The Gallatin Valley in Montana has a very rich deep soil, and as the rainfall of this district is much above the average for the State the most of the soil is rich in organic matter. When first settled, nearly 60 years ago, the practice was to crop the irrigated land every year to grain. In a few years' time, however, yields decreased markedly. It was found that summer fallowing would restore the fields. This practice was generally introduced until about 140 acres on the average for each irrigated farm was in fallow. One of the important things first taken up by the Montana Experiment Station was to study the effect of growing red clover and peas in place of the summer fallow. One of these early tests was a six-year rotation started in 1897, with 1 acre for each crop. This test closed in 1903, at which time the six different crops had been grown on each acre. The crops grown the sixth year were in the following order: Peas, wheat, clover, barley, sugar beets, oats. In 1904 the six acres were all plowed in the spring and seeded to oats. The results were as follows:

Six-year rotation at Bozeman, Mont.

Rotation crops.	Yield of oats after specified crops.
	Bushels.
Peas.....	106
Wheat.....	49
Clover.....	86
Barley.....	42
Sugar beets.....	82
Oats.....	64

Note particularly the large yield of oats after peas and clover, the leguminous crops, and also after sugar beets, the cultivated crop, as compared to the yields after wheat, barley, and oats. This is a larger difference when we consider that these crops were grown one year only.

SUCCESS DEPENDS ON CAREFUL PLANNING

Success in farming comes from an understanding and control of factors and forces that make for maximum plant growth and for the development of large and economic producing animals. We fall far short of possibilities in crop production because we do not yet know enough to exercise complete control over plant growth.

Irrigation water gives us an added element of control on our farm operation that may or may not help to give us larger crops, depending on how we use this water and how we plan our cropping system.

In planning a systematic rotation on the college farm a few years ago, a 5-acre field had to be cropped a third season to small grains. A crop of wheat followed by a crop of barley had been grown on this field. Adjoining the 5 acres was a 3-acre field that had grown a crop of peas. The 3 acres of peas land and 2 acres of the grain land were seeded to barley. There was such a contrast in the crop on the two parts of the field that they were cut separately. The barley after the peas yielded 63 bushels per acre, and on the 2 acres after the cereal crop the barley yielded 34 bushels per acre.

The remainder of the 3 acres of grain stubble land was seeded to oats and yielded 53 bushels per acre. Across a road running through the center of the college farm was a 9-acre field of oats, that was seeded on two-year-old clover sod plowed in the spring. The yield on this field was 115 bushels per acre. These and other experi-

ences have taught us that we can not afford to grow cereal grain on irrigated land in this valley unless we also grow clover or peas or some other soil enriching crop.

In 1908 the State of Montana established a branch experiment station in the Bitter Root Valley in the western part of the State. Orchard crops were being largely promoted and clean cultivation of the orchard tracts generally advocated. To study the effect of this practice as contrasted with cover crops, an experiment was planned with a new orchard just planted on the station farm. The cover crops used were red clover and field peas. One acre was given to each crop. At the end of eight years the trees on the clean cultivated acre were in a very unhealthy condition, all lacked in vigor and several trees had died. On the land planted to clover as a cover crop and none of the clover removed, the trees grew rapidly and kept vigorous and healthy. Peas as a cover crop helped the trees, but were not so beneficial as the clover.

These experiences and many more which might be added point to a lack of organic matter and nitrogen in the soil of our dry country. This lack is not apparent when the land is first cropped, but within a few years it shows up in reduced crops and impaired growth of the plants. The experiences also seem to show that the growth of leguminous crops seems to fully restore favorable crop-growing conditions.

The logic of these facts teaches us that on the irrigated farm we must build a systematic rotation in our cropping and introduce frequently the leguminous crops. The kind of leguminous crops to grow will vary in different localities and under different soil and climatic conditions. In the hot districts, with a well-drained calcareous soil, alfalfa is probably the best. The hairy vetch also seems to do well under these conditions. In the higher, cooler valleys red clover and peas do well. The sweet clover seems to do well under a quite wide range of conditions. The types of rotation to be adopted will in a large measure have to be built around the leguminous crops that do the best in the locality. These crops themselves have a large value, but the best returns from the farm are usually had by alternating them with cereal and other crops.

Reverting back to our original statement, the irrigated farm can only pay out when the soil is kept at its maximum fertility, and this is possible most easily and cheaply with the leguminous crops grown in proper rotation.

GROWING AND MARKETING HEARTS OF GOLD CANTALOUPE

New industry on the Newlands project, Nevada, promises large returns to the settlers and is helping to form a prosperous area where dairying and intensive farming predominate.

SEVEN years ago the first "Hearts of Gold" cantaloupe were grown on the Newlands project, Nevada, by Mr. O. J. Vannoy. The results obtained the first year, although not a pronounced success, owing to an unusually late frost, were sufficient to stimulate Mr. Vannoy's interest in this new variety of melon, with the result that the following season he procured more seed, planted a larger patch, and raised a crop of cantaloupe which for delicacy of flavor, fineness of texture, and quantity of meat surpassed all other melons with which he was familiar. Realizing the commercial possibilities of such a product, he increased his acreage the following year, advertised in a small way, and soon created a local demand for his output. Neighbors, observing his success, followed his lead and soon the popularity and demand for the "Hearts of Gold" grew beyond the bounds of the project, thus stimulating production to a point where, at the present time, the cantaloupe industry gives promise of becoming one of the important stable industries of the Newlands project.

In 1921 the Churchill County Cantaloupe Growers' Association was organized for the purpose of developing a market which would insure ready distribution and sale of the crop. Thirty-five car-lot shipments were made during the season, most of which went to mid-west and eastern markets. During the following season 169 cars were shipped, and it is estimated that 125 cars will have been put on the market by the close of the present season. This decreased output for 1923 is due to an unusually late frost in May, which necessitated replanting a portion of the crop.

The best sandy loam soil is selected for the production of cantaloupe, old stands of alfalfa frequently being plowed under for this purpose. The ground, after being carefully leveled and prepared, is marked off by irrigation furrows running east and west, where practical, and parallel to each other at a distance of 6 feet. The seed is then planted in shallow hills, 6 feet apart, on the north or sunny slope of the furrow, thus giving the hills a more direct exposure to the sun's rays. A dozen or more seeds are usually planted to the hill. These, however, are thinned out after sprouting, leaving only three or four of the hardiest plants. After planting the seed small "tents" of heavy oiled paper, open on the southern exposure, are placed over each hill as a protection from late frosts and to act as a hothouse to hasten germination of the seed. After the danger of frost is past and the plants have attained



"Hearts of Gold" cantaloupes grown on the Newlands irrigation project, Nevada.

sufficient growth the oiled papers are removed.

In order to procure maximum yield of the best quality cantaloupe, it is necessary to cultivate the field periodically throughout the season in a thorough manner, until such time as the spread of the vines prevents.

Proper irrigation is also an important factor in bringing the crop to successful fruition. Upon the application of water in sufficient quantity and at the proper interval of time may depend largely the success or failure in growing the finest quality melons. There is no rule of thumb regarding irrigation. Each individual grower must be governed by his own peculiar soil and drainage conditions. Generally

speaking, however, the average predominating soil type requires irrigation at approximately seven-day intervals.

Harvesting of the crop begins the latter part of August and continues up to the first frost, usually about September 20. An average production of 175 standard crates of marketable melons per acre has been attained for the past three years. A standard crate contains about 36 melons. The marketable melons do not, however, measure the total value per acre of the crop. Those unfit for market due to splits, blemishes, or size comprise about half the total crop, and since these have been found to be excellent hog feed a lucrative side line is being built up in conjunction with the industry.

POULTRY FOR THE HOLIDAY SEASON

THE advent of the month of November introduces the holiday season, and at this time of the year our thoughts are turned toward the joy and pleasure incidental to Thanksgiving, Christmas, and New Year. "But," you say, "what has the holiday season to do with poultry?" A great deal, kind reader, says H. O. Numbers, secretary of the Pennsylvania State Poultry Association.

If you will canvas the American homes on these festal days you will find that no matter how lowly the furnishings, and no matter how limited the finances, poultry—choice poultry—is the prevailing meat on the menu. The percentage of meats other than poultry consumed on these days is negligible by comparison.

There is one vital question each holiday season in American homes. "Where can we buy a turkey, or are they procurable at all?" And that is just the subject we want to discuss—turkeys.

According to latest census reports there were 3,627,028 turkeys on hand January 1, 1920. This number has not been increased to any extent in the past three years. We can safely assume that this number is about the amount held over annually for breeding purposes, as all flocks are marketed before January 1 of each year. Estimating that all these turkeys reproduced in proportion to the yields of the average flock, we will have 145,000,000 pounds of turkey meat. A mere "drop in the bucket" to feed 110,000,000 people for Thanksgiving, Christmas, and New Year. Then you wonder why there are no turkeys for sale. The comparative few that do find their way to the markets are bought by the favored or fortunate, and the majority of American homes must eat some other fowl.

There are 360 times more chickens raised annually than turkeys. Now to the point: The irrigated West offers an ideal location as well as other conditions conducive to successful turkey culture. The wild turkey thrives in all climates. So much more will the domesticated bird grow and do well under care and attention. We give you the result of a recent test: Fifty-five little turks were brooded by 3 turkey hens in an inclosure of 200 by 400 feet. A small makeshift shelter was provided. We lost two by natural causes. At five months we had youngsters that dressed, full drawn, 6 pounds. During the entire growing period we fed no hard grains. The principal articles of diet were greens, oatmeal, and thick milk. All feeds were fed moist. Three times a week we fed Epsom salts. We have proven that turkeys do not require a large range, and we have also proven that

we can raise turkeys up to 8 pounds live weight at a cost of \$1 per head.

Now is the time to secure your breeding stock for next season. You will not require pedigreed and show-room stock, but you will require healthy rugged birds.

We sometimes call the turkey the National Holiday Bird, and there is no reason why millions of people should be deprived of this holiday delicacy. If you farmers will "wake up" and "stock up" a few turkeys on your farms, you will collect some nice holiday money, and the buying public will be served according to their demands.

Alfalfa is a perennial legume belonging to the same family as peas, beans, and clover.

IRRIGATION DISTRICT OPERATION AND FINANCE

The following elements have proved necessary for the success of irrigation districts: Productive land, sufficient water, reasonable capitalization, and adequate land settlement.

These elements are discussed in a recent publication of the Department of Agriculture and should prove of value to those interested in the formation and management of irrigation districts. The publication sets forth important conclusions well supported by facts drawn from the past experience of irrigation enterprises as to the methods of administration and financing likely to insure the success of such enterprises.

Seventeen Western States now have legal machinery for the organization of irrigation districts and the various laws and methods are discussed in the bulletin.



Shoshone dam and power house Shoshone irrigation project, Wyoming

NOTES FROM RECLAMATION PROJECTS

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A revival of the sugar-beet industry on the Newlands project, Nevada, seems probable as a result of the sale of the sugar factory at Fallon to the Consolidated Independent Sugar Factories Corporation of Utah. The new company is planning a campaign with a view to contracting for 3,000 acres of beets to be grown on the project in 1924.

A cotton specialist from the Department of Agriculture was on the Carlsbad project, New Mexico, in September, conferring with the growers and urging the planting of uniform varieties of seed.

Returns on carload shipments of cantaloupes from the Newlands project, which were sent to New York and Chicago, were very satisfactory, prices ranging from \$3 to \$3.50 per crate September 10 on the Chicago market.

On September 7 the first carload of cotton, containing 48 bales, was shipped from the Yuma Valley plantations, Yuma project, Arizona-California, to a mill in Oakland, Calif. This was sold at an average price of 24½ cents.

During one week in September the total shipments from the Yakima project, Washington, amounted to 916 cars, of which 853 were fruit and 63 vegetables.

Apple growers on the Boise project and adjacent territory have perfected a permanent organization for cooperative protective purposes.

Crop conditions were reported excellent throughout the Rio Grande project, and the total value of the crop yield is estimated at more than a million dollars in excess of the past season.

The Army Air Service has completed an airplane mosaic photograph of the Polomas portion of the Rio Grande project for use in connection with investigations and studies of the secondary power dam.

Surveys have been completed recently by the Montana State Highway Commission for a Federal air road from Babb, Mont., to the Canadian border. This road will parallel the St. Mary Canal for several miles.

The citizens of Klamath Falls, on the Klamath project, held a celebration in October, the occasion being the commencement of work on the Natron cut-off, which will put Klamath Falls on the main line of the railroad.

F. C. Fricke, of California, and his son, E. C. Fricke, of Michigan, visited the Newlands project recently to investigate the opportunities for extensive colonization. The elder Mr. Fricke is a minister of the Mennonite faith and represents a large number of Russian Mennonites who are anxious to migrate to the United States, where they desire to purchase land and engage in intensive farming.

During the month of September the labor situation on the projects appeared to be showing a slight improvement, and shortage of labor was reported from only 12 projects.

The North Platte project has received a shipment of 61 head of young dairy stock, which are being sold among the farmers. This venture is supported by a revolving fund created by local bankers for the specific purpose through an assessment of 1 per cent on the capital stock of each bank.

Shipments of almonds from the Orland project totaled eight cars, which is two cars in excess of last year's shipment.

The orange growers and the almond growers on the Orland project have erected a packing house in Orland to be used jointly by these organizations.

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Broad fields of alfalfa provide feed for —

MELONS GROW LARGE IN THIS DISTRICT

The Irrigon District in the west extension of the Umatilla project, Oregon, produces a wide range of farm products, stated to be of the finest flavor and keeping qualities.



Watermelons—That's all.

Mr. N. Seaman, secretary of the Irrigon Commercial Club and one of the enterprising water users on the project, states that "Irrigon is famous for its fine-flavored watermelons, cantaloupes, and muskmelons. A strain of muskmelons named 'New Irrigons' was planted in a limited way in 1921 and 1922 and made a hit everywhere. Limited experiments were made with cantaloupes and a new strain developed for the district, which was extensively planted this season. These are known as 'The Pride of Irrigon.' They have pink meat of delicious flavor, are attractive in appearance, and have shipping qualities equal to any cantaloupe. The Kleckley sweet watermelon has been the old standby for the Irrigon District, and is well known in many parts of the State as having no equal."

The accompanying illustration shows four medium-size watermelons from the ranch of Mr. Seaman and his son.

COW WINS FIRST HONORS

JEWEL of Tintagel, the famous Jersey cow owned by Mr. and Mrs. M. Fortini, of Orland, Calif., has again won honors of the highest grade, having been awarded the grand championship of California for cream production in the AAA class.

This class is composed of cows handled on the utilitarian dairy basis, as distinguished from the artificial conditions under which most of the record-breaking productions are made. Under this test the cow is milked for 10 months, and has a calf during the 12-month period. Jewel of Tintagel proved herself the best cream producer in the State under these conditions.

Jewel is the same cow that was awarded the Reserve Grand Championship at the International Stock Show in San Francisco, and that twice was awarded the same honors at the State fair at Sacramento, besides being declared Grand Champion at the Glenn County fair.

PUREBRED DAIRY STOCK NOW IN GOOD DEMAND

Sale prices of purebred dairy cattle were relatively higher in 1922 than any other kind of purebred animals. Although prices were not high compared with the peak reached in 1920, the averages indicate that purebred dairy cattle were in good demand.

Average prices received by breeds, including all ages and both sexes at both private and auction sales, were—Ayrshire, \$181.73; Brown Swiss, \$223.53; Guernsey, \$273.36; Holstein, \$187.15; and Jersey, \$186.50.

COMMISSIONER DAVIS ADVOCATES DAIRYING

Commissioner David W. Davis is a firm believer in the dairy cow as a means of increasing the agricultural development of the irrigation projects. A practical farmer himself, he speaks with authority. During his trip in the early summer the commissioner visited the North Platte project and here sounded the keynote to successful agriculture on many of the projects in an address, in part as follows:

"We of Idaho had the same experience as you of Nebraska. We imagined that turning the water on our land solved all our difficulties. On the contrary it added to them. Not until we learned that it was the side issues on our farms that made the wheels revolve did we begin making headway. 'You have here one of the greatest potential dairy countries in America.

"Others have gone through all your experiences, and it would be well for you to profit by their example. Fill this wonderful valley with a lot of good dairy cows. Organize and build cheese factories that will make a brand of cheese that will find favor the world over. They are doing it in Minnesota and Wisconsin, and you have equal or better opportunities here. Cooperation, diversification, and application—that's the key you should sound. The Bureau of Reclamation can do just so much for you and no more. We must apply a general policy. The department will go its limit to advance your interests, but there is always a limit. Great corporations make their profits by conservation of the by-products. There are not enough by-products on the farms—cream, eggs, pork, and poultry. The household expenses should be paid from these sources."



Herds of purebred dairy cattle on the Irrigation projects.

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ACCORDING TO BLACKSTONE

THE Legislature of Oregon may create an irrigation district, describe its boundaries, its water supply, and irrigation system, and designate the land which will be benefited thereby, and the method of apportioning such benefits, or it may delegate its power to some tribunal to form such district, and to determine any or all of the questions of fact essential to the organization of the district. When the determination of the benefits from an irrigation district is made by the legislature, its determination is conclusive upon the owners and upon the courts; but if such determination is intrusted to a court or board, the inquiry is judicial in nature, and the owners are entitled to a reasonable notice and an opportunity to be heard "before the charge against their property for such benefits becomes irrevocably fixed. Since the legislature has conclusively determined by sections 7326 and 7328, Oregon Laws, that all lands susceptible of irrigation from the system of a district will be benefited thereby and that the benefits shall be apportioned by acreage except as to original cost (in which case lands already under irrigation shall be assessed only a portion of the cost represented by the additional water right necessary for them), the landowners are not entitled to notice and an opportunity to be heard upon the question of benefits to their lands. Where the legislative determination of benefits from the irrigation district, though not subject to constitutional objections, will work a substantial legal injury in its application to a particular tract of land, the courts will grant relief to the landowner, and the legislature, in enacting the irrigation district law, has provided for such cases by section 7341, Oregon Laws, under which a landowner may petition to have his land excluded from the district and is entitled to such exclusion if his lands already receive a complete irrigation from another system, and lands so excluded shall not be liable for any portion of the cost to the district incurred after the petition is presented, thereby giving adequate protection to a diligent owner. (In re Harper Irr. Dist. (Oreg.), 216, Pac. 1020.)

The impounding of water in a reservoir as authorized by sections 7093, 7096, and 7113, Montana Revised Codes, 1921, for the purpose of irrigation and power development is a lawful business and not a nuisance *per se*. Persons impounding waters are not insurers against damage caused thereby and are liable only for failure to exercise ordinary care in the construction and operation of their plants. In an action to enjoin the maintenance and operation of a reservoir

authorized by section 2096, Montana Revised Codes, 1921, on the ground that it constituted a nuisance in that during the winter season when water was released for power development purposes an unnatural fluctuation of several feet in the level of the river below resulted, which fluctuation caused breaking and jams of ice with resulting floods and damage to plaintiff's property, failure of plaintiff to allege and prove negligence of defendants held fatal to their action, the maintenance of such reservoir being a lawful business and not a nuisance *per se*. (Jeffers v. Montana Power Co. (Mont.), 217 Pac. 652.)

Waters of nonnavigable streams in excess of the amount which can be beneficially used either directly or prospectively within a reasonable time or in connection with riparian lands are subject to appropriation for use on nonriparian lands. Where the supply of water in a nonnavigable stream is limited, the presumption is that the riparian lands require all the waters of the stream, and the burden is on the nonriparian appropriator to show that no riparian right will be injured. Where the supply of water in a nonnavigable stream is more than ample for all possible riparian uses, the presumption is that the diversion by a nonriparian user will not injure any riparian right, and the burden of proving substantial injury is on the riparian owner. (Brown v. Chase (Wash.), 217 Pac. 23.)

A patent to land is the highest evidence of title when issued under authority of law and is conclusive against the Government and all the world until set aside, it having the sanction of and being the result of investigation by the Land Department. When officers acting within jurisdiction have issued a patent, it can not even for fraud or mistake be canceled or annulled except in a suit in equity and at the instance of the

CORN CROP ON YAKIMA PROJECT

On his return from his recent western trip Commissioner Davis reported seeing corn in some of the irrigated fields in the Sunnyside division of the Yakima project, Washington, which reached to a height of 20 feet. The corn crop on this project is expected to be the largest in years, according to the commissioner.

United States. Where land is not owned by the United States or has been appropriated to a particular use or reserved from sale, the land officials are without jurisdiction to dispose of it, and if, in defiance of law, a patent issue to it, the same is ineffectual to pass title and is void from the beginning and may be attacked collaterally. The Government is not estopped by the unauthorized acts of its agents. (West v. Minneapolis Mining & Smelting Co. (Mont.), 217 Pac. 342.)

In re Harper Irrigation District (216 Pac. 1020) the Supreme Court of Oregon reaches the following conclusions relative to the organization of irrigation districts in that State:

Several copies of an identical petition for the organization of an irrigation district, prepared and circulated by, or at the direction of, the same group of persons, and signed by different landowners, may be bound together and presented as one petition, though the statute does not expressly provide that the petition may consist of a number of separate instruments.

One who signs a petition for an irrigation district as guardian or as administrator is not required to have an order of the probate court granting authority to sign the petition.

Neither the administrator of a deceased entryman under the public land laws nor the guardian of the heirs of such entryman, is authorized to sign a petition for an irrigation district, since the wards or minor heirs of the estate do not own the land in fee.

The term "entryman" as used in the law authorizing an entryman on public lands of the United States to sign a petition for an irrigation district does not include the heirs of an entryman who dies prior to completing his entry by final proof, and such heirs are not qualified petitioners.

It is not a prerequisite to the qualification of a petitioning entryman that he has complied with all of the requirements of the United States public land laws, since those requirements can not all be complied with until the organization of the district has been fully completed.

Under section 7305, Oregon Laws, requiring the petition for an irrigation district to be published at least four successive weeks, together with a notice stating the time of the meeting at which the petition will be presented, the notice to be published must be signed by the petitioners, and a notice signed only by the clerk of a county court is insufficient.

The publication of the petition and notice as required by section 7305, Oregon Laws, is essential to jurisdiction to establish and define the boundaries of a proposed irrigation district, actual knowledge being insufficient.

A landowner may erect an obstruction to prevent the influx of water caused by another's irrigation operations. Generally, one who diverts water from its natural course is responsible for it while thus out of its wonted channel. (Street v. Ringsmyer (Oreg.), 216 Pac. 1017.)

CROP CONDITIONS ON THE PROJECTS

THE following is a brief summary of crop conditions on the irrigation projects of the Department of the Interior, Bureau of Reclamation, at the end of September:

Yuma project, Arizona-California.—The cotton crop was practically all matured and gins were running to capacity. Prices showed a steady upward trend, at the close of the month being 28½ cents per pound. The second crop of alfalfa seed was being harvested with very light yields. Cover crops were plowed under on the Mesa during the month, and preparations were being made to plant a winter cover crop.

Orland project, California.—A good fifth crop of alfalfa was grown, but rain damaged what was cut and delayed further harvesting. Rain also delayed the harvesting and drying of fruits and nuts and damaged figs and almonds. The yield of milo was very good.

Grand Valley project, Colorado.—The third cutting of alfalfa was harvested and stacked and some farmers were already beginning to market the hay crop. The outlook was favorable for profitable returns from this crop all over the project. The sugar-beet crop also promised very favorable returns. Final payment by the Holly Sugar Corporation on last year's crop brought the returns to \$10.55 per ton. Potatoes also yielded well and have brought fair prices. The good returns from these three principal crops were expected to increase the general prosperity of the farmers.

Umcompahgre project, Colorado.—The grain harvest was practically completed. Prospects were excellent for good yields of sugar beets with a high sugar content. Harvesting of onions and of winter varieties of fruits was in progress. About 40 per cent of the potato crop was harvested, the yields being about one-third below normal. The price dropped during the month from \$1.40 per hundredweight to 75 cents per hundredweight, and much of the crop consequently will go into storage.

Boise project, Idaho.—The third cutting of alfalfa was being put up. The yield was fair and the quality good. There was a large acreage in corn and the quality and yield were good. Many fields of potatoes yielded very poorly, some so low that digging was not profitable. Peaches were plentiful, and a heavy crop of apples was being harvested. Prices of prunes dropped to a point where it was unprofitable to pick.

Minidoka project, Idaho.—Threshing of wheat was practically completed; and the third cutting of alfalfa was in progress, some of which was damaged by weevils and grasshoppers. Harvesting of sugar beets and potatoes was under way.

Huntley project, Montana.—Some beet fields were running 18 tons per acre. Harvesting, however, was delayed by wet weather. All beans not threshed were probably spoiled, which will cause a serious loss to the growers.

Milk River project, Montana.—The second cutting of alfalfa was in progress. Only a few fields will yield a third cutting. The blue-joint hay crop was far below normal, owing to flood conditions in June and July. Most of the small trial plots of sugar beets appeared to be doing well, and corn was yielding satisfactorily.

Sun River project, Montana.—Grain crops on the Greenfields division were running somewhat under what was anticipated, owing to damage by grasshoppers and continued planting to grain. The second cutting of alfalfa was light. Excellent yields of potatoes were obtained, and test plots of sugar beets produced a fine crop.

Lower Yellowstone project, Montana-North Dakota.—Good yields of all crops were reported with the exception of grain. The beet harvest began September 24 and it was expected that the average yield for the project would be about 11 tons per acre.

North Platte project, Nebraska-Wyoming.—Threshing was practically completed, the yields of grain being about average. The potato crop was poor because of blight and insect pests. Corn promises to be very good. The yield of sugar beets is about 10 to 15 tons per acre.

Newlands project, Nevada.—The cantaloupe season was one of the best since melon culture was taken up. Commission men agree that the melons are of superior quality and that the trade name "Hearts of Gold" and a market have been established. Prices ranged high and a good return is anticipated. One grower near Fallon was reported to have taken \$6,000 worth of melons from 20 acres. About 48 cars were shipped from the Fallon and Swingle Bench districts and 40 from the Fernley district. Grain made an excellent crop, and preparations were being made to plant an increased acreage to winter wheat. The fruit harvest will be excellent, especially apples, peaches, apricots, and pears.

Carlsbad project, New Mexico.—The fourth cutting of alfalfa and in some cases a fifth cutting was being harvested, prices averaging about \$20.50 per ton. Cotton picking started at the beginning of the month, and at the end of the month the gins were running overtime to take care of the crop. About 1,000 bales had been ginned, the price ranging from 28 to 30 cents per pound.

Rio Grande project, New Mexico-Texas.—Cotton picking had begun, with the price

still high and the yield above the average. Several carloads of apples were shipped from Yeleta and Las Cruces. The fourth cutting of alfalfa had been harvested without a great deal of damage by rains, as happened to the third cutting.

Williston project, North Dakota.—Considerable interest was being shown in trial plots of sugar beets, which seem to promise well for the project. The general failure of dry-land crops is turning attention to the irrigated land.

Umatilla project, Oregon.—The third crop of alfalfa was harvested, but prices were low and there was little demand. Picking and packing of early varieties of apples were started.

Klamath project, Oregon-California.—Harvesting of the second cutting of alfalfa was practically completed. Grain cutting was nearing completion and threshing was in progress.

Belle Fourche project, South Dakota.—The third cutting of alfalfa was harvested, but was badly damaged by rain. The corn yield was satisfactory and many fields were being grazed by sheep and hogs. The yield of sugar beets was good and the returns were expected to be very satisfactory.

Strawberry Valley project, Utah.—Condition of all irrigated crops was excellent. Picking of the apple crop was expected to begin shortly. Approximately 200 carloads of peaches were shipped from the county during the month. The grain crop was about threshed with few sales reported. Digging of sugar beets had commenced and indications pointed to an abundant yield and a gross production of 275,000 bags of sugar. A bonus of \$1 to \$1.50 per ton on last year's beet crop was declared by the Utah-Idaho Sugar Co. and it is anticipated that \$100,000 to \$150,000 will be distributed among the water users.

Okanogan project, Washington.—The fruit crop was in good condition, but prices for early apples, although as good as or better than last year, were not high enough to give much net return to the growers.

Yakima project, Washington.—The soft-fruit harvest was completed, nearly all of the last cutting of alfalfa was in the stack, and grain had been threshed. Picking of Jonathan and Delicious apples was under way, with promise of a large crop.

Shoshone project, Wyoming.—Harvesting of crops continued until the last week of the month, when a series of heavy rains stopped all field work and did some damage. The potato market for early varieties continued good, although there was not much movement during the last 10 days of the month. The general tone of the community continued optimistic as a result of good crops and fair prices.

JACK RABBIT UPSETS EAGLE'S PLAN FOR MEAL

Miles Cannon, Field Reclamation Commissioner, vouches for the truth of this story:

On the Flathead (Indian) project, Montana, recently, a jack rabbit was blissfully enjoying the scenery when a bald eagle spied the jack and decided that here was his meal waiting for him. The jack saw the eagle in time and raced away with the huge bird in hot pursuit, with talons ready to grasp his prey. At the psychological moment, however, the jack doubled to the right and the eagle swept on for 20 yards before he was able to make the turn.

Again the eagle swooped to the attack and again at the critical moment the jack swerved and foiled his pursuer. Nothing daunted, the eagle tried a third time. Circling above the jack the eagle dived with talons spread. Again the jack stepped on the accelerator. As the eagle swooped above his quarry, the king of the air dropped low over the jack, the great outspread wings preventing a sidewise jump. It looked bad for the jack, but as the eagle poised for the final act in the drama, the jack suddenly bounded in the air like a rubber ball, struck the bird a resounding blow below the center of the right wing, and turned him completely over in a cloud of dust.

CROP PRICES, SEPTEMBER, 1923.

Project.	Alfalfa hay, per ton.		Barley, per bushel.	Oats, per bushel.	Wheat, per bushel.	Potatoes, per bushel.
	In stack.	Baled at shipping point.				
Salt River.....	\$10.00-\$12.00	\$14.00-\$16.00	\$0.85	\$1.10	\$1.50	
Yuma.....	12.00	16.00				
Orland.....	9.00	13.00	.65		.99	
Grand Valley.....	11.00	14.00		.55	.90	
Uncompahgre.....	8.00			.40	.90	\$0.45
Boise.....	8.00	11.00	.46	.40	.78	.60
King Hill.....	8.00					.60
Minidoka.....	7.00	10.00	.60	.32	.84	.54
Milk River.....	10.00	13.00	.42	.50	.95	1.20
Sun River.....	9.00	13.00	.60	.65	.91	.60
Lower Yellowstone.....	6.00		.38	.27	.97	.75
North Platte.....						
Newlands.....	8.00	12.00	.75	.60	1.05	1.05
Carlsbad.....		21.00				
Rio Grande.....		20.00				
Williston.....	15.00			.30	.96	1.25
Umatilla.....		12-13				
Klamath.....	8.00		.72	.48	.90	
Belle Fourche.....	4.00	9.00	.38	.25	.54	
Strawberry Valley.....	10.00	13.00	.70	.60	.80	1.00
Okanogan.....	12.00					.60
Yakima.....		10-13			.92	.75
Riverton.....	12.00	15.00	.72	.60	.85	
Shoshone.....	11.00	13.50	.52	.50	.87	.60
Indian projects:						
Blackfeet.....	10.00		.90	.32	.86	1.20
Flathead.....	8.00	12.50		.35	.90	.90
Fort Peck.....	10.00		.50	.50	.90	.65

While the eagle was floundering on the ground, trying to regain his equilibrium and composure, the intelligent jack beat it for the next county.

MONTHLY CONDITIONS OF PRINCIPAL BUREAU OF RECLAMATION RESERVOIRS FOR SEPTEMBER, 1923.

[Elevation above sea level.]

State and project.	Reservoir.	Available capacity in acre-feet.	Elevation.		Storage in acre-feet.			Out-flow in acre-feet.	Elevation of water surface.		
			Spill-way crest. ¹	Lowest gate sill. ²	Begin-ning of month.	End of month.	Maxi-mum.		Begin-ning of month.	End of month.	Maxi-mum.
Arizona, Salt River.....	Roosevelt.....	1,575,000	2128.1	1924.6	396,052	431,282	442,375	46,323	2073.47	2077.6	2078.55
California, Orland.....	East Park.....	51,000	1199.68	1111.68	10,850	1,915	10,850	8,986	1166.8	1145.73	1166.8
Idaho:											
Boise.....	Arrowrock.....	280,000	3211	2956	91,020	14,478	91,020	118,440	3127.2	3044.1	3127.2
	Deer Flat.....	177,000	2518	2488	59,239	27,477	59,239	38,902	2502.88	2496.72	2502.88
Minidoka.....	Lake Wolcott.....	95,180	4245	4236	75,080	55,040	75,080	217,953	4243.25	4241.42	4243.25
	Jackson Lake.....	847,000	6709	6728	303,330	145,200	303,330	193,136	6745.89	6738.07	6745.89
Montana:											
Milk River.....	Nelson.....	70,000	2223	2200	42,000	38,500	42,000	290	2216.95	2216.03	2216.95
St. Marys storage.....	Sherburne.....	66,000	4788	4720	31,740		31,740		4763.8	4726.4	4763.8
Sun River.....	Willow Creek.....	16,700	4130	4082	12,209	12,113	12,209	416	4125.3	4125.2	4125.3
Nebraska-Wyoming, North Platte.....	Pathfinder.....	1,070,000	5832	5670	792,220	656,840	792,220	179,814	5438.07	5439.06	5438.07
	Lake Alice.....	11,400	4182	4159	5,300	6,500	6,500		4172.9	4175	4172.9
	Lake Minatare.....	60,760	4125	4074	50,000	43,400	50,000		4119.8	4116.4	4119.8
Nevada, Newlands.....	Lake Tahoe.....	120,000	6239	6224				28,084	6226.81	6226.35	6226.81
	Lahontan.....	273,600	4162	4000	166,770	141,960	166,770	36,096	4148.7	4144.3	4148.7
New Mexico:											
Carlsbad.....	McMillan.....	45,000	3267.7	3241.6	1,000	8,500	8,500	6,000	3254.3	3259	3259
Rio Grande.....	Elephant Butte.....	2,638,000	4407	4231.5	1,343,313	1,379,825	1,387,127	78,942	4367.4	4368.9	4369.2
Oregon, Umatilla.....	Cold Springs.....	50,000	621.5	560	18,950	8,650	18,950	8,432	596.01	582.82	596.01
Oregon-California, Klamath.....	Clear Lake.....	462,000	4540	4514	332,000	321,000	332,000		4535	4534.5	4535
South Dakota, Belle Fourche.....	Belle Fourche.....	203,000	2970	2920	172,380	173,860	173,860	9,525	2970.9	2971.1	2971.1
Utah, Strawberry Valley.....	Strawberry.....	250,000	7559	7517	224,800	206,700	258,600	15,100	7554.5	7552.4	7559
Washington:											
Okanogan.....	Conconully.....	14,400	2290	2232	3,697	1,186	3,697	3,103	2261.7	2260.1	2261.7
Yakima.....	Bumping Lake.....	34,000	3426	3389	24,477	8,952	24,477	15,525	3429.7	3402.2	3429.7
	Lake Cle Elum.....	20,800	2134	2122	10,086	6,374	10,086	3,712	2134.66	2125.81	2134.66
	Lake Kachess.....	210,000	2258	2192	124,287	70,489	124,287	53,798	2249.16	2217.9	2249.16
	Lake Keechelus.....	152,000	2515	2425	51,793	9,108	51,793	42,685	2511.68	2432.25	2511.68
Wyoming, Shoshone.....	Shoshone.....	456,600	5360	5132.3	423,385	424,020	424,020	36,658	5354.9	5355	5355

¹ Or maximum storage.

² Or zero storage.

³ Zero water depth at elevation 1902.2.

⁴ Amount of silt shown by silt survey deducted from original capacity.

Proposed regulation.

Estimated low-water limit under proposed plan of regulation.

⁵ Elevation of reservoir raised 12 inches by stop logs in spillway.

ADMINISTRATIVE ORGANIZATION OF THE BUREAU OF RECLAMATION.

DEPARTMENT OF THE INTERIOR.

HON. HUBERT WORK, Secretary of the Interior.
EDWARD C. FINNEY, First Assistant Secretary.
FRANCIS M. GOODWIN, Assistant Secretary.
JOHN H. EDWARDS, Solicitor for the Interior Department.
EBERT K. BURLEW, Administrative Assistant to the Secretary.
JOHN H. MCNEELY, Assistant to the Secretary.
JOHN HARVEY, Chief Clerk.

BUREAU OF RECLAMATION.

WASHINGTON, D. C.

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DENVER, COLO.

F. E. Weymouth, chief engineer, Wilda Building, Denver, Colo.; R. F. Walter and C. P. Williams, assistant chief engineers; Miss L. H. Meisel, secretary to the chief engineer; J. M. Gaylord, electrical engineer; J. L. Savage, designing engineer; James Munn, engineer; J. R. Ummel, chief clerk; A. McD. Brooks, purchasing agent; Harry Caden, fiscal agent.

PROJECT ORGANIZATION.

Belle Fourche Project.—B. E. Hayden, project manager, Newell, S. Dak.; R. C. Walber, chief clerk.
Boise Project.—J. B. Bond, project manager, Boise, Idaho; Walter Ward, engineer in charge construction Black Canyon Dam; E. R. Mills, chief clerk; C. F. Weinkauff, fiscal agent.
Carlsbad Project.—L. E. Foster, project manager; Carlsbad, N. Mex.; V. L. Minter, chief clerk and fiscal agent.
Grand Valley Project.—S. O. Harper, project manager, Grand Junction, Colo.; W. J. Chiesman, chief clerk; C. E. Brodie, fiscal agent.
Huntley Project.—A. R. McGinness, project manager, Ballantine, Mont.; H. S. Elliott, chief clerk; Miss M. C. Simek, fiscal agent.
King Hill Project.—George H. Harris, acting project manager, King Hill, Idaho; T. W. Hause, chief clerk; E. V. Hillius, fiscal agent.

Klamath Project.—H. D. Newell, project manager, Klamath Falls, Oreg.; N. G. Wheeler, chief clerk; G. R. Barnhart, fiscal agent.

Lower Yellowstone Project.—H. A. Parker, project manager, Savage, Mont.; E. R. Scheppelmann, chief clerk.

Milk River Project.—G. E. Stratton, project manager, Malta, Mont.; E. E. Chabot, chief clerk; G. S. Moore, fiscal agent.

Minidoka Project.—Barry Dibble, project manager, Burley, Idaho; Dana Templin, engineer; E. C. Diehl, chief clerk; Miss A. J. Larson, fiscal agent; F. A. Banks, engineer; H. N. Bickel, chief clerk, American Falls, Idaho.

Newlands Project.—J. F. Richardson, project manager, Fallon, Nev.; A. W. Walker, engineer; G. B. Snow, chief clerk; Miss Ethel M. Simmonds, fiscal agent.

North Platte Project.—Andrew Weiss, project manager, Mitchell, Nebr.; H. W. Bashore, engineer, Fort Laramie Division; T. W. Parry, irrigation manager; L. H. Mong, chief clerk; Mrs. A. L. Truax, fiscal agent.

Okanogan Project.—Calvin Casteel, project manager, Okanogan, Wash.; W. D. Funk, chief clerk and fiscal agent.

Orland Project.—R. C. E. Weber, project manager, Orland, Calif.; E. T. Eriksen, engineer; C. H. Lillingston, chief clerk and fiscal agent.

Rio Grande Project.—L. M. Lawson, project manager, El Paso, Tex.; C. A. Peavey, chief clerk; L. S. Kennicott, fiscal agent.

Riverton Project.—H. D. Comstock, project manager, Riverton, Wyo.; L. H. Mitchell, engineer; R. B. Smith, chief clerk; W. J. Fogarty, fiscal agent.

St. Mary Storage Division.—R. M. Snell, project manager, Browning, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Salt River Project.—Being operated by the Salt River Valley Water Users' Association; C. C. Cragin, general superintendent and chief engineer, Phoenix, Ariz.

Shoshone Project.—J. S. Longwell, project manager, Powell, Wyo.; J. R. Iakisch, engineer; C. M. Jump, superintendent of irrigation; W. F. Sha, chief clerk; Miss L. C. Drinkwater, fiscal agent.

Strawberry Valley Project.—W. L. Whittemore, project manager, Provo, Utah; H. R. Pasewalk, chief clerk; W. C. Berger, fiscal agent.

Sun River Project.—G. O. Sanford, project manager, Great Falls, Mont.; H. W. Johnson, chief clerk; F. C. Lewis, fiscal agent; G. A. Benjamin, irrigation manager, Fairfield, Mont.

Umatilla Project.—H. M. Schilling, project manager, Hermiston, Oreg.; R. M. Conner, engineer in charge construction McKay Dam; G. C. Patterson, chief clerk and fiscal agent; C. B. Funk, fiscal agent.

Uncompahgre Project.—L. J. Foster, project manager, Montrose, Colo.; G. H. Bolt, chief clerk; F. D. Helm, fiscal agent.

Williston Project.—W. S. Arthur, project manager and chief clerk, Williston, N. Dak.; H. C. Malaas, fiscal agent.

Yakima Project.—J. L. Lytel, project manager, Yakima, Wash.; R. K. Cunningham, chief clerk; J. C. Gawler, fiscal agent; M. D. Scroggs, superintendent of irrigation, Sunnyside, Wash.; J. S. Moore, superintendent of irrigation, Route 6, Yakima, Wash.; F. T. Crowe, engineer in charge construction Tiston Dam, Rimrock, Wash.; C. F. Gleason and W. C. Christopher, engineers; V. G. Evans, chief clerk; C. F. Williams, fiscal agent.

Yuma Project.—P. J. Preston, project manager, Yuma, Ariz.; R. M. Priest, superintendent of construction; D. C. McConaughy, engineer, Yuma Mesa Division; D. C. Caylor, superintendent of irrigation; C. A. Denman, chief clerk; E. M. Philebaum, fiscal agent.

INDIAN PROJECTS.

Blackfeet Project.—R. M. Snell, project manager, Browning, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Flathead Project.—C. J. Moody, project manager, St. Ignatius, Mont.; S. A. Kerr, engineer in charge construction Hubbard Dam; J. M. Swan, chief clerk; J. P. Siebeneicher, fiscal agent.

Fort Peck Project.—E. L. Decker, acting project manager, Poplar, Mont.; Henry Berryhill, chief clerk and fiscal agent.

FIELD LEGAL OFFICES.

Boise, Idaho.—B. E. Stoutemyer, district counsel. Projects: Boise, Minidoka, King Hill, and Jackson Lake Enlargement.

Denver, Colo.—Legal section office of chief engineer; R. M. Patrick and Armand Offutt, district counsel.

Las Cruces, N. Mex.—Mark B. Thompson, attorney. Projects: Rio Grande, Carlsbad, and Hondo.

Helena, Mont.—E. E. Roddis, district counsel, Helena, Mont. Projects: Blackfeet, Flathead, Fort Peck, Huntley, Milk River, St. Mary Storage, Sun River, North Dakota Pumping, Lower Yellowstone, and Shoshone.

Mitchell, Nebr.—J. N. Beardslee, district counsel. Projects: North Platte, Belle Fourche, and Riverton.

Montrose, Colo.—J. R. Alexander, district counsel. Projects: Grand Valley, Uncompahgre, and Strawberry Valley.

Portland, Oreg.—H. L. Holgate, district counsel, Post Office Building. Projects: Yakima, Okanogan, Umatilla, Klamath, and Baker.

San Francisco, Calif.—P. W. Dent and Brooks Fullerton, district counsel, 349 Pacific Building. Projects: Salt River, Yuma, Orland, and Newlands.

WHAT THE SERVICE STANDS FOR.

“UNDER the provisions of the reclamation act the relations of the Secretary of the Interior to your activities and your duties are peculiarly close and intimate. We are members of a great organization engaged in an important creative work. It is my earnest desire to exercise the duties imposed upon me in a manner which will promote the hearty cooperation of all who are devoting their lives to this task.

“I know that the Nation owes much to the pioneers who have wrested an empire from the western arid wastes, for I have lived among them. Their accomplishments have contributed largely to our national wealth and to the stability of our institutions, and their personality has broadened the vision of a people.

“In so far as authority is granted me, I shall gladly extend the services and sympathy of this department in the problems looking toward their advancement.”

HUBERT WORK,
Secretary of the Interior.

COMPLAINTS

COMPLAINTS continue to come in against individuals in the office of project managers; sometimes personal in character and again that surplus help is retained in some of them, thus adding to maintenance cost.

The Secretary hopes that water users will be considerate of bureau employees and their duties, recalling that many of us cannot always do as we wish, but only the best we can.

On the other hand, the operation of a project is the settlers' business. Although not the employer, they are paying for the service and are entitled to be heard.

Grounded complaints are invited, but they should be substantial.

Something cheerful from the field is grateful news in the Department and there must be much of it.

—HUBERT WORK.

The Reclamation Record

Vol. 14

NOVEMBER-DECEMBER, 1923

Nos. 11 and 12



THE DITCH RIDER.

TABLE OF CONTENTS

	Page
<i>Vision</i>	309
<i>Washington office reorganization saves thousands</i>	311
<i>Notes on reclamation</i>	311
<i>Division of functions of bureau put into effect</i>	312
<i>Statement of arrearages in payment</i>	312
<i>Special advisors outline scope of investigation</i>	313
<i>The personnel</i>	313
<i>Analysis of reclamation projects</i>	314
<i>Federal reclamation primarily a farmer's problem</i>	316
<i>Map of the National Park-to-Park Highway</i>	316
<i>Water economy</i>	316
<i>Beet growers given big price for crop</i>	316
<i>Commissioner of Reclamation climbs life's ladder</i>	317
<i>Cheese factories succeed on the Minidoka project</i>	319
<i>Cream checks big item here</i>	319
<i>Business methods for marketing potatoes succeed</i>	320
<i>The late spud</i>	320
<i>Frost handicaps farmers on North Platte project</i>	321
<i>Evils of waste of water and how to lessen them</i>	322
<i>The hay stacker is a valuable farm adjunct</i>	323
<i>Reclamation Record covers two months</i>	323
<i>Construction of the Thomas Point pumping plant</i>	324
<i>More fresh-laid eggs needed</i>	325
<i>Cotton farmer explains success</i>	326
<i>Crop conditions on the projects</i>	327
<i>Two spud growers on the Shoshone project</i>	327
<i>Notes from reclamation projects</i>	328
<i>Bureau of Reclamation wins in Supreme Court</i>	329
<i>Snake loses his head but accounts for dog</i>	329
<i>The project manager and the water users</i>	330
<i>What is your state of mind?</i>	330
<i>Secretary Work seeks advice of Congressmen</i>	330
<i>Commissioner Davis looks over Columbia Basin</i>	331
<i>Among the files</i>	331
<i>Dairy calves and young stock</i>	331
<i>Organization chart, Bureau of Reclamation</i>	332

THE RECLAMATION RECORD is sent, without direct charge, to the water users on the irrigation projects of the Bureau of Reclamation. To other than water users the price is 75 cents per year, payable in advance. Subscriptions should be sent to the Chief Clerk, Bureau of Reclamation, Washington, D. C., and remittances (postal money order or New York draft) should be made payable to the Special Fiscal Agent, Bureau of Reclamation. Postage stamps will not be accepted.

VISION.

WE are all inclined to disparage the visionary, forgetting that much of the world's advancement has been wrought from the dreams of men who were perhaps more facile in anticipation than accomplishment. They were endowed with the power to create the picture which it remained for others to execute.

When the ability to dream and execute is combined in an individual, we find the genius.

Peter the Great, when prompted to relinquish temporarily the throne of barbarous Russia and journey to Holland to enter the employ of a ship's carpenter, was a man of vision. But when he had spent several years in perfecting himself in craftsmanship and natural science, returning to his native country to introduce the civilization of Europe to a people who still performed their mathematical calculations by means of balls strung on wire, he proved that he was also a man of practice.

He personally investigated the natural resources of Russia, sounded the rivers and harbors, compiled maps, built locks, and constructed roads and canals across his desolate domain.

True, there were those who libeled and ridiculed him for a visionary; nevertheless, in a single generation, by introducing education, printing, engineering, and architecture to his countrymen, he advanced the standard of civilization in Russia by hundreds of years.

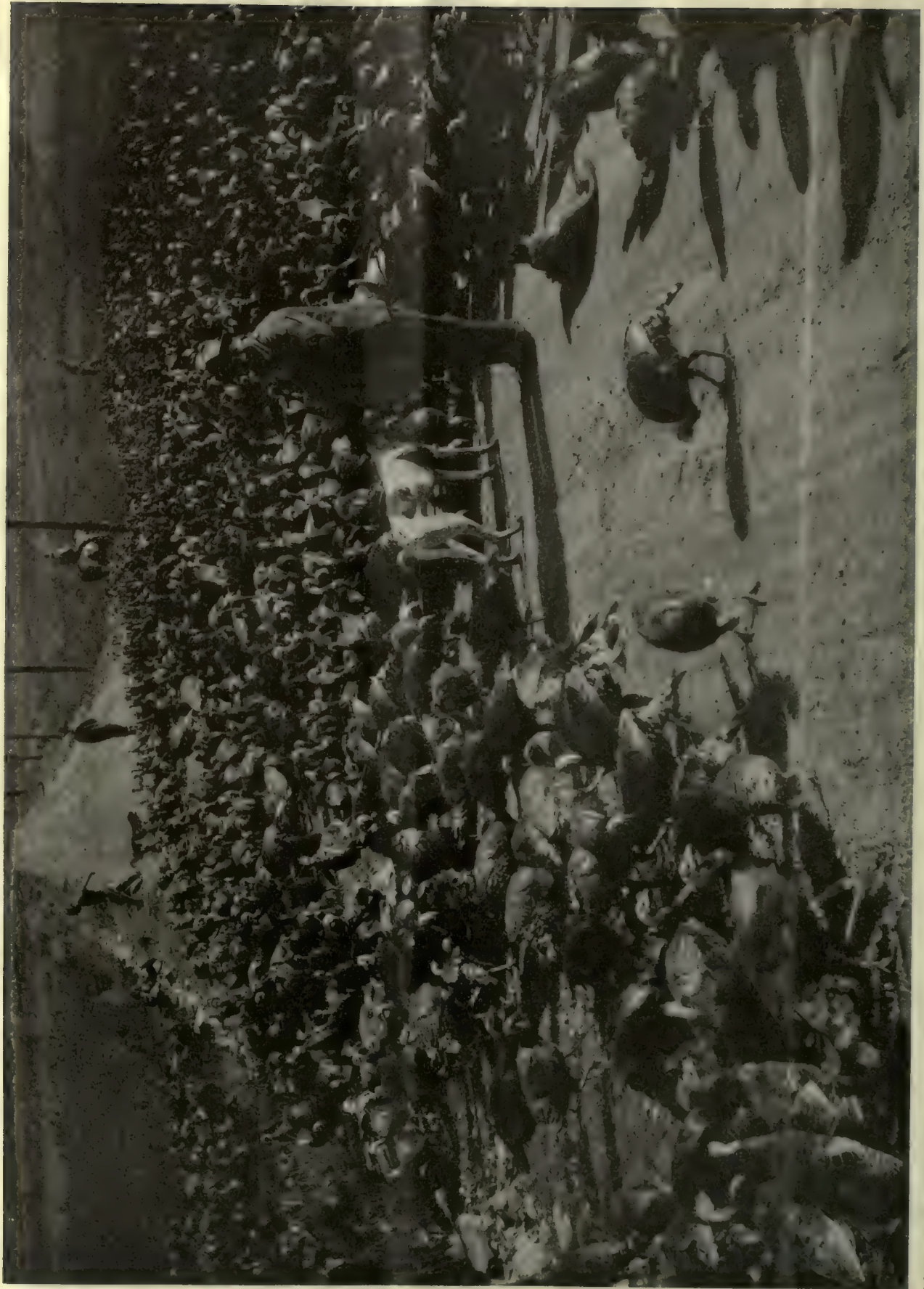
But it is not given to all of us to bridge the extremes between vision and accomplishment. More often our part is to span a single gap in the general plan, which, in our complex life, requires many hands to fashion into the likeness conceived by the dreamer who went before.

The pioneer who first mentally changed the desert sand into fertile soil, the adobe hut into a farmhouse, the cactus plant into wheat, and the sagebrush into orchards was undoubtedly a visionary.

But it remained for the statesman, the lawyer, the engineer, the artisan, the business man, and the farmer to bring about the transformation.

Each of them possessed in a degree the divine gift of vision, but predominating was the ability to execute, the patience to achieve, and the hard work necessary to overcome obstacles.

They illustrated Emerson's aphorism that "In nature nothing can be given—all things are sold."



Johnson and Son, Boise, Idaho.
FIVE THOUSAND IDAHO TURKEYS FOR THE THANKSGIVING AND CHRISTMAS MARKETS. THE IRRIGATION PROJECTS ARE IDEAL BREEDING PLACES FOR THE NATIONAL HOLIDAY BIRD.

THE RECLAMATION RECORD

Issued monthly by the Department of the Interior, Bureau of Reclamation, Washington, D. C.

HUBERT WORK
Secretary of the Interior

DAVID W. DAVIS
Commissioner, Bureau of Reclamation

Vol. 14

NOVEMBER-DECEMBER, 1923

Nos. 11 and 12

WASHINGTON OFFICE REORGANIZATION SAVES THOUSANDS.

Through a reassignment of duties the services of 12 employees are dispensed with and 16 are given nominal promotions—Number of consulting engineers reduced and other expenditures to be eliminated in the near future.

A COMPLETE reassignment of the Washington office of the Bureau of Reclamation coincident with the reorganization of the field service has been made by Secretary of the Interior Work. The change will go into effect on December 1.

The plan provides for the discontinuance of the services of 12 employees, with an ultimate annual saving of \$43,500 in salaries, and nominal promotions of 16 employees, amounting annually to \$2,450, whose work entitled them to higher pay. With the transfer of the former Assistant Director of the Reclamation Service to the legal division without change in salary, the position of assistant commissioner has been discontinued. The total number of employees in the Washington office under the new plan will be 56.

The actual net saving, effective December 1, 1923, amounts to \$25,440 a year, with an additional saving of \$18,060 in the near future. In addition to this saving in salary the water users will be relieved of considerable expense in the form of traveling expenses of some of the employees whose services have been discontinued, and while the amount can not be accurately estimated it will run into thousands of dollars annually.

Other fruits of the reorganization include the termination of the services of 15 consulting engineers who have been carried on the rolls of the bureau at salaries ranging from \$9 to \$50 per day when actually employed, while 7 other per diem employees are eliminated from the force.

Definite reassignment of duties and changes in titles of many employees are also made. The office of the commissioner's assistant is abolished and the "lands and contracts" division is combined with the legal division. A chief clerk's division is established for the purpose of taking over the work performed by the mails and files, settlement, appointments, and stenographic sections. The photographic laboratory is abolished and the negatives and other photo-

graphic material have been turned over to the photographic branch of the Geological Survey. Numerous other changes in titles of various employees to conform to their new assignments of work are made, while other titles are discontinued altogether.

NOTES ON RECLAMATION.

The Reclamation Service must study footprints, together with blue prints, from now on. Blue prints have many abandoned monuments. Footprints mean people passing this way.

Reclaiming Reclamation is well started in the Department of the Interior at Washington.

The bureau has been reorganized, records are being studied, and an understandable accounting system is being installed. The original estimates and reports of former hearings are being examined, when they can be found, by the Advisory Committee, and Members of Congress have been invited by the Secretary of the Interior to advise with this committee on present conditions in their respective States and to help formulate a future policy.

Two coordinators from other departments were assigned to the work of bringing the reorganization to the highest possible point of morale and efficiency by the recognition of merit where shown, elimination of lost motion and duplications of service, the discontinuance of unnecessary methods, practices, titles, and positions, and the supplying of additional help where needed. The following excerpts from their report, dated October 31, will be of interest to the water users:

"We found the bureau organized along unbusinesslike lines and that the results

achieved were not commensurate with the effort and money expended. The titles held by some are not descriptive of the duties performed, and the work assigned others is not of a nature to warrant a supervisory or professional title. Terms used in the accounting division have long been the source of confusion even within the bureau and reports received by us from the division concerning expenditures for 'settlement' work were not accurate in their presentation of costs."

Their report carries a total of 27 recommendations covering various phases of administration. One of their recommendations summarizes briefly the reorganization plan effected, as follows:

"That the Washington office of the Bureau of Reclamation be reorganized in accordance with the plan shown on the chart, Exhibit A. This plan provides that the position of assistant to the commissioner of reclamation be eliminated as it is unnecessary to have both an assistant commissioner and an assistant to the commissioner. That the lands and contracts division be consolidated with the legal division and the use of the title 'Lands and contracts' be discontinued. The work of the lands and contracts division is approximately one-third legal and the remainder related clerical work. That the sections known as the mails and files, settlement, appointments, stenographic, and photographic laboratory be placed under the supervision of the chief clerk and consolidated into one division to be known as the chief clerk's division. At present the mails and files, appointments, and messenger sections are under the assistant to the commissioner; the settlement, stenographic, and photographic laboratory sections are under the editor who has charge of the miscellaneous division; and the chief clerk is in the miscellaneous division, under the editor, having charge of one chauffeur and one purchasing clerk."

DIVISION OF FUNCTIONS OF BUREAU PUT INTO EFFECT.

Separation of engineering and administration duties brought about through reorganization of field service; Field Reclamation Commissioner to control operation of projects.

A DISTINCT division of the functions of the field service of the Bureau of Reclamation has been brought about through a reorganization plan promulgated by Secretary of the Interior Work, which becomes effective January 1, 1924.

This consists of a separation of the engineering and the administrative activities with the result that the chief engineer's office will handle the engineering work, including reconnaissance and investigation of proposed projects and the designing and construction of irrigation works; while a field commissioner, with an office to be established at a central point in the West, will have control of the operation and management of the business and agricultural affairs of all the projects.

Managers of projects will continue to have charge of the work of all kinds under their projects, but will report to the field commissioner on all matters pertaining to operation, improvement of farm conditions, industrial betterment, collection of water rentals and other charges, and procuring settlers for projects. On all engineering problems that arise on the project the project manager will continue to report to the chief engineer.

Both the field commissioner and the chief engineer, under the reorganization, will be separately under the supervision of the commissioner of the Bureau of Reclamation, who in turn is under the direct supervision of the Secretary of the Interior.

An outline of the field organization follows:

Commissioner.—Under the supervision of the Secretary of the Interior, the commissioner of the Bureau of Reclamation, with office at Washington, D. C., shall have charge of all work of the bureau. The commissioner shall report to the Secretary of the Interior.

Chief engineer.—Under the supervision of the commissioner of reclamation, the chief engineer, with office at a point designated by the Secretary of the Interior (now Denver), shall have charge of all engineering work, including reconnaissance, investigation, design and construction, and such other work as may be assigned. The chief engineer shall report to the commissioner.

Field commissioner.—Under supervision of the commissioner of reclamation, the field commissioner, with office at a point designated by the Secretary of the Interior,

shall have charge of the operation of reclamation districts, including delivery of water, lands, crop production, handling and marketing, improvement of farm conditions, industrial betterment, collection of water and other charges, and settlement of lands. The field commissioner shall report to the commissioner.

Project managers.—Under supervision of the commissioner, field commissioner, and chief engineer, project managers, with offices at points designated by the commissioner, shall have charge of the work of all kinds related to their respective project. The project managers shall report to the commissioner, field commissioner, and chief engineer according to subject matter as indicated by this order.

District counsel.—Under supervision of the chief counsel, located at Washington, D. C., the district counsel, with offices at points designated by the commissioner, shall have charge of legal work in their respective districts and shall when called upon assist the field commissioner and the chief engineer and their forces. The district counsel shall report to the chief counsel.

STATEMENT OF ARREARAGES IN PAYMENT OF OPERATION AND MAINTENANCE AND CONSTRUCTION CHARGES AND PENALTIES COLLECTED.

State.	Project.	Uncollected on June 30, 1923, subject mostly to 12 per cent penalty per annum.				Collections on account of penalties to June 30, 1923.		
		Construction repayments.	Operation and maintenance repayments.	Rentals.	Total.	Construction.	Operation and maintenance.	Total.
Arizona.....	Salt River.....					\$26,312.08		\$26,312.08
Arizona-California.....	Yuma.....	\$73,436.24	\$179,259.28	\$4,852.06	\$257,547.59	36,982.34	\$25,192.31	62,174.65
California.....	Orland.....		218.62		218.62	37.42	37.77	75.19
Colorado.....	Grand Valley.....			32,904.63	32,904.63			
Do.....	Uncompahgre.....	102,665.34		139,017.30	1,939.27			1,939.27
Idaho.....	Boise.....	338,564.61	250,953.20	13,127.47	602,635.28	35,516.90	31,152.96	66,669.86
Do.....	Boise drainage.....		152,572.61		152,572.61			
Do.....	Kling Hill.....	127,416.97		2,861.36	130,278.33			
Do.....	Minidoka.....	307,796.60	176,992.97	267.60	485,057.17	44,319.45	22,289.01	66,608.46
Kansas.....	Garden City.....			207.92	135,235.16	3,364.51	6,815.26	10,179.77
Montana.....	Huntley.....	32,297.46	102,729.78		23,470.81			
Do.....	Milk River.....			23,470.81	83,679.25	1,619.28	2,036.58	3,655.86
Do.....	Sun River.....	19,360.17	37,426.19	26,892.89	133,135.39	14.88	2.59	17.47
Montana-North Dakota.....	Lower Yellowstone.....		131,738.89	1,396.50	1,109,181.30	80,038.96	25,212.38	105,251.33
Nebraska-Wyoming.....	North Platte.....	670,279.46	438,317.73	584.11	116,748.13	5,771.33	11,288.97	17,060.30
Nevada.....	Newlands.....	24,689.44	92,139.19	19.50	85,654.28	13,836.00	14,214.57	33,050.57
New Mexico.....	Carlsbad.....	35,428.54	50,225.74		35.49			
Do.....	Hondo.....			34,028.18	34,037.18		1,505.08	2,435.67
New Mexico-Texas.....	Rio Grande.....	9.00						
North Dakota.....	Buford-Trenton.....					.35		.35
Do.....	Williston.....		45,242.55		45,242.55		1,918.76	1,918.76
Oregon.....	Umatilla.....	50,033.13	31,060.78		81,693.91	11,851.03	6,347.57	18,198.60
Oregon-California.....	Klamath.....	30,641.67	61,415.86	475.80	82,433.23	2,720.65	2,691.90	5,412.55
South Dakota.....	Belle Fourche.....	271,312.06	344,920.58	150.00	616,382.64	16,458.60	15,046.41	32,105.01
Utah.....	Strawberry Valley.....	79,948.71	27,796.83		107,745.54	6,379.60	2,789.25	9,168.85
Washington.....	Okanogan.....	1,913.35	3,718.59	1,643.97	7,275.91	1,236.08	6,192.60	7,428.68
Do.....	Yakima.....	180,853.17	117,916.24	614.83	299,384.24	52,266.80	34,692.94	86,959.74
Wyoming.....	Riverton.....							
Do.....	Shoshone.....	190,796.64	188,403.42	252.15	379,442.21	8,240.75	8,862.54	17,103.29
Total.....		2,537,222.46	2,423,649.08	180,137.23	5,141,008.75	354,836.86	218,889.45	573,726.31

¹ In addition to this amount, there is, on the Salt River project, a deferred charge of \$738,602.20 drawing 6 per cent interest; and of the \$5,141,008.75 a portion will be charged only 6 per cent interest instead of 1 per cent per month, in accordance with relief granted by Congress.

SPECIAL ADVISORS OUTLINE SCOPE OF INVESTIGATION.

Secretary Work's Committee of Special Advisors on Reclamation gives detailed statement of its plan of inquiry into past history, present economic condition, and future possibilities of irrigation projects.

EARNEST desire to learn the facts concerning the operations of the Bureau of Reclamation is evidently the paramount aim of the Committee of Special Advisors on Reclamation appointed recently by Secretary of the Interior Work. The committee in whole or in part has been in almost continuous session since assembling for the first meeting on October 15, has heard the testimony of a large number of individuals, and has called constantly for reports and documents bearing on the investigation. The results of this preliminary work have been crystallized into a "Plan of inquiry" relating to each project, both primary and secondary. That the inquiry will be exhaustive is indicated by the following brief summary of the plan:

The large number of secondary projects investigated by the bureau to determine their feasibility head the list, with request for information concerning their location, by whom suggested, time of examination, and findings.

The next section calls for an exhaustive historical statement concerning the primary projects, including such topics as description of lands, history of construction, changes in original engineering plans and estimates, increase in final cost due to such changes, ownership of land at time of opening, etc.

The engineering structures are to be treated comprehensively, reporting on such questions as whether they are well built, preliminary estimates of cost, final estimates of cost, whether they were built economically, operation and maintenance costs, power developments, and proposed extensions.

The soils, climate, seepage, and drainage receive a special paragraph, with numerous subheads, calling for a wide variety of data.

A paragraph of special importance relates to markets and transportation facilities, including such questions as the charges for carrying products to markets and the prices of commodities shipped into the projects.

One of the most important sections of the plan relates to the problems of settlement, and the committee asks for detailed information relating to this subject, under such heads as the size of the farm unit, the number and acreage of homesteads entered each year, the number of farms brought under cultivation, abandoned farms, sales of farms, tenantry, and the nationality, education, and previous pursuits of the settlers.

The financial history of the settlers calls for special comment, the inquiry calling for information concerning financial aid available to the settlers, amount borrowed by

them, failure to meet Government obligations, accumulated profits, and increase of values.

THE PERSONNEL

JAMES R. GARFIELD, of Cleveland, Ohio, Secretary of the Interior in the Cabinet of President Roosevelt, who is thoroughly familiar with reclamation problems;

Thomas E. Campbell, of Phoenix, Ariz., former Governor of Arizona, and chairman of the Colorado River Basin Project, 1921;

Elwood Mead, of Berkeley, Calif., engineer, member of American Society of Civil Engineers and British Institute of Civil Engineers; engineer of Wyoming, 1888-89; chief of irrigation and drainage investigations United States Department of Agriculture, 1897; chairman State rivers and water supply commission, Victoria, Australia, 1907-1915; consulting engineer for various irrigation works; and author of articles on irrigation and engineering subjects;

Oscar E. Bradfute, of Xenia, Ohio, president American Farm Bureau Federation and of Ohio Farm Bureau Federation; member of the board of control of Ohio Agricultural Experiment Station;

Julius H. Barnes, of Duluth Minn., president United States Chamber of Commerce;

Dr. John A. Widtsoe, of Salt Lake City, Utah, director Utah Experiment Station, 1900-1905; president Agricultural College of Utah, 1907-1916; president of International Dry Farming Congress, 1912; and author of articles on dry farming and irrigation subjects;

Clyde C. Dawson, of Denver, Colo., lawyer, who has given much attention to irrigation law and irrigation subjects.

The Special Advisory Committee is holding daily sessions in Room 6106, Interior Department Building. Thomas E. Campbell is the chairman and Dr. John A. Widtsoe is the secretary.

Realization of the fact that no community can be considered successful which neglects development along social lines, the inquiry calls for information regarding the prevalence of good roads, schools, churches, amusement halls, homes and their furnishings, and automobiles. A census of auto-

mobiles on the projects will be especially illuminating as a side light on the growth of this means of transportation by the farmer.

Naturally the agricultural history of the projects has a large place in the investigation. One and two crop systems come in for special mention, as does rotation of crops. The inquiry also calls for the acreage in the various crops and the number of domestic animals. The large interest which is being taken in different associations for the disposition of farm products demands special treatment, the inquiry seeking information concerning alfalfa-meal mills, creameries, cheese factories, sugar factories, cotton gins, and the like. Under this head also come such topics as agricultural implements, irrigation practice, acre yields of various crops, shipments to and from the projects, and last but not least the cost of crop production, about which little is definitely known at the present time.

Technical aid for settlers is an interesting topic for discussion and should develop many timely suggestions concerning agricultural and business advice and the relations between the bureau and the settlers.

Full information is also requested concerning the Bureau of Reclamation, its personnel, accounting system, general policies and practices, and processes of administration. Similar questions are asked concerning the project management.

The latter part of the inquiry is devoted to questions concerning the present status of the work and of the repayments made to the Government by the settlers; an analysis of the reclamation acts; the cost of the projects and the prospect for repayment; and the future of the projects.

This is a brief summary of the general scope of the inquiry and of the tremendous task which the committee has outlined for itself. The department and the bureau will, of course, cooperate to the fullest extent with the committee in the hope that the findings will be conclusive.

The average price received by growers for mixed varieties of cowpeas, which constitute one-fourth of the commercial supply, is 10 per cent to 25 per cent less than that received for straight varieties.

The results obtained from the cultivation of any tillable soil depend upon the individual who tills the soil even more than upon the inherent fertility of the soil itself.

ANALYSIS OF RECLAMATION PROJECTS.

State.	Project.	(1) Years water delivered calculated from year irrigation began, although works not completed.	(2) Original estimated cost. ¹	(3) Net construction cost to June 30, 1923. ^{2 3 4}	(4) Original estimated irrigable acreage.	(5) Acreage bureau prepared to supply water 1922. ⁵	(6) Acreage actually irrigated 1922. ⁶
Arizona.....	Salt River.....	17	¹¹ \$5,650,000.00	\$10,548,119.28	200,000	¹² 213,170	¹³ 203,330
Arizona-California.....	Yuma.....	17	¹⁴ 2,701,196.00	9,026,546.52	76,966	63,200	53,970
California.....	Orland.....	14	¹⁵ 685,085.00	1,091,795.87	17,000	20,670	15,120
Colorado.....	Grand Valley.....	9	4,565,000.00	4,017,921.98	53,000	30,000	12,370
Do.....	Uncompahgre.....	16	2,500,000.00	6,715,074.41	100,000	97,410	64,730
Idaho.....	Boise.....	18	^{18 19} 9,867,800.00	12,731,409.73	371,700	143,000	112,000
Do.....	King Hill.....	3	1,000,000.00	1,881,391.45	15,000	13,650	6,440
Do.....	Minidoka.....	17	2,538,656.00	8,054,663.26	121,000	121,560	105,590
Kansas.....	Garden City ²¹	(²¹)	258,000.00	385,651.07	8,600	(²¹)	(²¹)
Montana.....	Huntley.....	16	²² 900,000.00	1,474,408.81	35,000	32,000	19,520
Do.....	Milk River.....	13	²³ 7,426,452.00	6,762,083.25	251,906	66,500	18,170
Do.....	Sun River.....	15	¹⁸ 7,372,400.00	4,245,842.94	256,000	42,470	20,530
Montana-North Dakota.....	Lower Yellowstone.....	14	¹⁸ 2,039,218.00	3,110,449.22	66,000	40,200	15,600
Nebraska-Wyoming.....	North Platte.....	16	¹⁸ 3,500,000.00	13,672,160.32	100,000	162,240	111,250
Nevada.....	Newlands.....	18	5,383,997.00	6,988,475.92	370,000	73,750	44,960
New Mexico.....	Carlsbad.....	17	600,000.00	1,393,994.79	20,000	25,000	24,080
Do.....	Hondo ²¹	(²¹)	275,000.00	371,867.17	10,000	(²¹)	(²¹)
New Mexico-Texas.....	Rio Grande.....	16	²⁵ 7,200,000.00	²⁵ 12,146,114.43	175,000	116,000	89,590
North Dakota.....	Williston.....	16	235,460.00	460,107.18	8,795	7,650	1,590
Do.....	Buford-Trenton ²¹	(²¹)	134,500.00	221,864.69	4,500	(²¹)	(²¹)
Oregon.....	Umatilla.....	16	1,086,000.00	2,683,399.89	20,140	24,590	13,270
Oregon-California.....	Klamath.....	17	4,394,311.00	3,974,463.70	236,401	51,000	36,000
South Dakota.....	Belle Fourche.....	16	2,335,000.00	3,547,045.03	79,000	82,190	31,150
Utah.....	Strawberry Valley ²⁸	9	²⁹ 2,722,000.00	3,466,968.00	60,000	53,890	30,820
Washington.....	Okanogan.....	16	¹⁸ 432,500.00	1,302,161.65	8,650	8,000	5,570
Do.....	Yakima.....	17	^{18 20} 6,545,803.00	²⁴ 12,161,931.67	181,769	133,340	123,700
Wyoming.....	Riverton ²¹	(²¹)	6,777,025.00	1,060,228.09	100,000	(²¹)	(²¹)
Do.....	Shoshone.....	16	¹⁸ 4,310,238.00	8,280,865.42	110,000	71,220	42,780
Total.....			93,435,641.00	141,787,005.74	3,056,427	1,692,700	1,202,130

¹ Approximately at time construction approved by Secretary of Interior; supplemental construction not included in these estimates.

² These costs include supplemental construction and amounts expended under Warren Act and special contracts on 11 projects (estimated total \$12,922,455).

³ Represents amount to be repaid by water users (including operation and maintenance during construction; excluding arrearages in operation and maintenance heretofore transferred to construction).

⁴ Extension act, 1914, provided 20 years additional time for payment of unpaid amounts.

⁵ Water sold under Warren Act and special contracts not included in columns 5 and 6.

⁶ Includes advance payments: Construction, \$366,334.27.

⁷ Includes arrearages on operation and maintenance transferred; excludes operation and maintenance during construction in column 3.

⁸ Does not include water rentals and sales of water during construction period, which are contained in net figure, column 3.

This amount includes \$1,059,864.31, representing costs from Jan. 1 to June 30, 1923, for which no assessments have been made against the water users, leaving a net arrearage of \$4,628,623.45 on operation and maintenance.

¹⁰ Water rentals assessed are included in column 3.

¹¹ Salt River: Original estimate not found. Estimate used secured from "Table of approved projects, with estimated costs," submitted to House Committee on Irrigation of Arid Lands, Apr. 16 to 30, 1906.

¹² Salt River: Acreage includes lands taken in by the Salt River Valley Water Users' Association on which the association spent additional money for construction work.

¹³ Salt River project operated by Salt River Valley Water Users' Association.

¹⁴ Yuma: This is original estimate of Yuma project and does not include Yuma Mesa auxiliary now under construction: \$300,000 was added to the above estimate at a later meeting of board of engineers.

¹⁵ Orland: Original estimate \$650,000. Revised estimate of September, 1910, \$685,085.

ANALYSIS OF RECLAMATION PROJECTS.

(7)	(8)	(9)	(10)	(11)	(12)		(13)	(14)	(15)	(16)	(17)
Amount paid by water users on construction to June 30, 1923. ⁴	Difference between net construction cost (col. 3) and amount paid on construction (col. 7), representing amount unpaid on construction. ⁴	Original estimated cost per acre based on columns 2 and 4.	Actual cost per acre to June 30, 1923, based on acreage bureau prepared to supply 1922 (col. 5). ^{2,5}	Actual cost per acre to June 30, 1923, based on acreage actually irrigated (col. 6). ^{2,5}	Aggregate charge per acre to settlers now being made under public notice.		Total operation and maintenance cost to June 30, 1923. ⁷	Total operation and maintenance receipts to June 30, 1923. ⁸	Amount unpaid on operation and maintenance, June 30, 1923, being difference between cost (col. 13) and receipts (col. 14). ⁹	Delinquent charges, rentals of irrigation water, June 30, 1923. ¹⁰	Total amount unpaid by water users, being totals of columns 8, 15, and 16.
					Original.	Supplemental.					
\$891,815.82	\$9,656,303.46	\$28.00	¹² \$49.50	¹² \$51.90	¹² \$60.00		(¹³)	(¹⁴)	(¹⁵)		\$9,656,303.46
1,093,052.01	7,933,494.51	35.10	142.80	167.45	55.00		\$1,667,980.99	\$956,921.08	\$711,039.91	\$4,852.06	8,649,386.48
240,614.58	851,181.29	40.29	52.80	72.20	75.00						
(¹⁶)	4,017,921.98	86.00	133.90	324.80	44.00	\$11.00	218,610.67	200,351.55	18,259.12		869,440.41
102,706.34	6,612,368.07	25.00	68.90	103.60	(¹⁷)		(¹⁶)	(¹⁶)	(¹⁶)	32,904.63	4,050,826.61
					70.00		81,724.16	1,543.60	80,180.56	36,351.96	6,728,900.59
1,408,314.08	11,323,095.65	26.55	89.00	113.70	26.80		1,631,887.35	1,424,251.14	207,636.21	13,127.47	11,543,859.33
(¹⁸)	1,881,391.45	66.66	137.75	292.15	77.44						
2,866,208.24	5,188,455.02	20.98	66.30	76.20	30.00	12.00	1,381,916.18	1,198,418.06	183,498.12	2,861.36	1,884,252.81
51,176.11	334,474.96	30.00	(²¹)	(²¹)	56.50						
361,056.23	1,113,352.58	25.71	46.10	75.50	(²¹)		(¹⁶)	(¹⁶)	(¹⁶)	267.60	5,372,220.74
1,114.00	6,760,969.25	29.48	101.70	372.20	30.00		850,502.46	321,806.29	528,696.17	207.92	334,474.96
170,178.73	4,075,664.21	28.80	100.00	206.80	15.00						1,642,256.67
41,332.70	3,069,116.52	30.90	77.35	200.00	(¹⁷)			(¹⁶)	(¹⁶)	23,470.31	6,784,440.06
1,742,767.58	11,929,392.74	35.00	84.30	122.90	30.00		201,770.14	124,686.46	77,083.68	26,892.89	4,179,640.78
522,100.51	6,466,375.41	14.55	94.75	155.45	36.00		744,420.61	62,361.87	682,058.74	1,396.50	3,752,571.76
391,577.34	1,002,417.45	30.00	55.75	57.90	45.00	18.50	2,032,953.08	1,347,895.73	685,057.35	584.11	12,615,034.20
(²¹)	371,867.17	27.50	(²¹)	(²¹)	55.00		(²¹)	(²¹)	(²¹)		6,803,640.82
76,491.00	12,069,623.43	30.00	104.70	135.60	52.00		1,046,236.05	708,990.14	337,245.91	19.50	1,080,546.84
8,250.63	451,856.55	26.75	50.15	290.00	(²¹)		483,724.56	405,595.17	78,129.39		371,902.66
(²¹)	221,864.69	29.88	(²¹)	(²¹)	90.00		(²¹)	(²¹)	(²¹)	35.49	12,265,275.33
373,919.76	2,309,480.13	53.90	109.10	202.20	38.00		548,366.12	386,742.40	161,623.72	34,028.18	780,504.04
537,692.72	3,436,770.98	18.59	77.90	110.40	98.00		357,244.00	28,596.51	²⁷ 328,647.49		294,318.35
478,279.90	3,068,765.13	29.55	43.15	113.85	70.00	(²⁰)	74,771.07	2,317.41	²⁷ 72,453.66		
396,582.88	3,070,385.12	45.37	64.30	112.50	92.00	(²⁰)	534,116.72	251,651.55	282,465.17		2,591,945.30
54,427.70	1,247,733.95	50.00	162.80	233.80	30.00	(²⁰)	582,268.18	439,773.12	142,495.06	475.80	3,579,741.84
3,171,575.12	8,990,356.55	36.00	91.20	98.30	30.00		972,057.67	529,317.96	442,739.71	150.00	3,511,654.84
(²¹)	1,060,228.09	67.77	(²¹)	(²¹)	40.00		352,254.65	243,775.56	108,479.09		3,178,864.21
611,608.50	7,679,256.92	39.18	116.40	193.80	80.00		379,212.10	223,082.51	156,129.59	1,643.97	1,405,507.51
					95.00		2,300,887.18	2,093,687.09	207,200.09	614.83	9,198,171.47
15,592,842.48	126,194,163.26	²² 30.57	²² \$3.76	²² 117.94	52.00		(²¹)	(²¹)	(²¹)	(²¹)	1,060,228.09
					93.00						
					50.00	19.50	616,347.91	418,978.89	197,369.02	252.15	7,876,878.09
					51.00						
					52.00	30.00					
					95.00						
							⁹ 17,059,231.85	²⁸ 11,370,744.09	⁹ 5,688,487.76	180,137.23	132,062,788.25

¹⁵ Grand Valley, King Hill, and Milk River projects not under public notice; water sold on rental basis.

¹⁷ Rental basis.

¹⁸ Original estimates on these projects include operation and maintenance in following sums: Boise, \$1,858,500; Sun River, \$1,030,000; Lower Yellowstone, \$333,000; North Platte, \$500,000; Okanogan, \$55,000; Yakima, \$850,614; Shoshone, \$275,000; total, \$4,899,114.

¹⁹ Boise: Only half of project started on this estimate.

²⁰ District contract.

²¹ Garden City, Hondo, and Buford-Trenton projects abandoned.

²² Huntley: Estimate of board of engineers, Feb. 26, 1905, \$499,178; estimate given in table (\$900,000) is amount specified in authority of Secretary of the Interior for construction, Apr. 18, 1905.

²³ Milk River: This estimate made June 3, 1912, includes St. Marys storage and Dodson unit, construction of which started prior to this date.

²⁴ \$8 and district contract.

²⁵ Rio Grande: This estimate secured from "Table of approved projects with estimated costs," submitted to House Committee on Irrigation of Arid Lands, Apr. 16 to 30, 1906.

²⁶ Rio Grande: Cost includes \$1,000,000 covered by special appropriation not to be repaid by water users.

²⁷ Williston: Operation and maintenance loss prior to Apr. 1, 1919, \$178,667.20; Buford-Trenton, abandoned, operation and maintenance loss, \$71,149.39.

²⁸ Strawberry Valley: Water sold on acre-foot basis, not on acreage basis.

²⁹ Strawberry Valley: Estimate submitted, June, 1910.

³⁰ Yakima: Total of original estimates on Sunnyside, Tieton, and Wapato units.

³¹ Riverton: Under construction; no lands irrigated.

³² Average.

³³ Includes advance payments; operation and maintenance, \$19,251.60.

³⁴ Includes \$2,515,875.62 for Rimrock Dam, which will irrigate additional acreage.

FEDERAL RECLAMATION PRIMARILY A FARMER'S PROBLEM.

Field Commissioner in statement to Special Advisor's Committee declares that engineering and construction features are ones of short duration, while producer's interests continue forever.

FEDERAL reclamation is primarily and ultimately a farmer's problem, Field Commissioner of Reclamation Miles Cannon told members of the Special Advisory Committee on Reclamation at a recent hearing. He continued:

"Engineering is the means employed only to obtain certain substantial and permanent results. Construction is made possible, it may be suggested, by a generous use of public funds, and which under the law must be returned to the reclamation fund by the farmers. Comparatively speaking, the construction period is of short duration, while the producer's interest continues forever.

"The farmer's task of reclaiming arid lands entails problems more potent perhaps than those encountered by the engineer. The latter, having the support of the Government, is relieved, in a measure, of financial anxiety and has only to follow well-defined lines. The water user, however, in addition to a few outstanding principles of agriculture, must in order to create new wealth to repay that advanced by a generous Government, encounter and solve a multitude of uncharted problems of the most baffling nature.

"It should be borne in mind likewise that the farmer has in the solution of his problems the additional responsibility of sustaining perpetually the burdens of state as well as

those of society. It is not too much to say that the sovereignty of the State is based on agriculture; but more especially is this true of the Western States where reclamation is designed to be made, and, in fact, is the foundation upon which all activity either directly or indirectly is based.

"It follows, therefore, that the water user in addition to providing the cost of construction, must put life into the arid soil, construct buildings, dig wells, acquire machinery and livestock, plant trees and seeds, and then learn by costly experience the better means of crop production. He must, moreover, sustain in a large measure at least the cost of new political divisions, highways, schools, churches, courts, and State institutions, including the universities in which students are equipped for, among other commendable purposes, reclamation engineers. I conclude, therefore, that the farmer's problems on reclamation projects are paramount, and that his interest entitles him to the most practical and sympathetic cooperation on the part of the Government.

"Were I to offer, what I may term a constructive criticism, it would be directed not toward the achievements of the engineer, but to a governmental policy long since adopted, of concentrating the resources of the Government almost, it would seem, exclusively, on the construc-

tion end of reclamation, and this policy, unfortunately, is still being maintained. It is not contrary, I believe, to any well defined rule of reasoning to reach the conclusion that such a policy will eventually contribute largely to a general curtailment, if not the destruction, of a national program designed to expedite the development and equalize the progress of the several Western States. It may, in my opinion, successfully be affirmed that the reclamation of the arid lands of the west is one of the most constructive agricultural measures enacted by the National Congress since the adoption of the homestead law, but its success depends primarily, in my judgment, upon the general welfare of the farmer engaged in irrigation.

"Having in the preceding paragraph used the term 'governmental policy,' it may be proper to explain that I find this policy is to open wide the door and permit anyone, no matter how illy prepared he may be, to occupy a unit and then permit him to shift for himself. In other words, the position of the Government seems to be, as expressed by one critic, 'We have constructed the projects; now let the farmers pay the bills.' The weakness of this position, however, on the one hand, and the necessity of a well organized force on the part of the Government to increase production, on the other, is self-evident."

MAP OF THE NATIONAL PARK-TO-PARK HIGHWAY

Approved by Secretary of the Interior Work, the National Highways Association has issued recently a map of the Western States, in colors, about 20 by 36 inches in size, showing the National Park-to-Park Highway, principal tributary roads, other proposed national highways, irrigation projects of the Bureau of Reclamation, Indian reservations, national forests, national parks and monuments, and many cities and towns.

The map was made under the supervision of John C. Mulford, chief cartographer of the National Highways Association, and formerly employed in the drafting section of the Washington office of the Bureau of Reclamation.

A copy of the map will be sent free to any one requesting it of the National Highways Association, Washington, D. C.

WATER ECONOMY.

Water economy, says W. H. Snelson, means that no more water should be applied to a crop than can be retained within the feeding zone of the plant roots and used to advantage by the crop; that percolation and evaporation losses be reduced to a minimum by properly constructed field laterals and well-leveled land; and that water requirements per unit of yield be decreased by maintaining the fertility of the soil. Economical irrigation consists in applying to a crop sufficient water to raise the moisture content of the soil occupied by the feeding plant roots to the optimum percentage for growth, with the least possible loss from deep percolation.

BEET GROWERS GIVEN BIG PRICE FOR CROP

Western Colorado beet growers received an average price of \$10.55 per ton for their last year's crop.

The average pre-war price for beets was approximately \$5 per ton, indicating that the farmers of western Colorado and other parts of the country who grow beets are prospering.

The entire crop of the beet growers of western Colorado was sold to sugar-beet mills in the vicinity, who manufactured sugar out of it and sold the sugar in the local market, thus saving all costs of transportation.

Beet growing in the West is largely located on Government reclamation projects, with the result that this industry is growing rapidly and is certain to bring large financial returns to all farmers who raise beets.

COMMISSIONER OF RECLAMATION CLIMBS LIFE'S LADDER.

David W. Davis was immigrant, coal miner at 12, manager of farmers' association, cashier and president of bank, State senator, governor, and captain of irrigation.

THE magazine section of the Washington (D. C.) Sunday Post of October 28, 1923, contains an interesting story of a red-headed immigrant baby who turns out to be the Commissioner of Reclamation. It follows:

The appointment of David William Davis of Idaho to head the Federal Bureau of Reclamation directed attention to an interesting chapter in that big national volume called "America Means Opportunity."

Immigrant baby, coal miner at 12, clerk in a store, manager of a farmers' association, cashier of a bank, president of another, trustee of a college, State senator, governor, captain of national irrigation—these are the ascending labels on the rungs of the Davis ladder. And there is room for more.

David Lloyd-George and David William Davis were born at points not many miles apart on that little lump of British coal called Wales. The father of David William was a miner and when he brought his family to the New World in 1875 settled at Angus, Iowa, a small hamlet in a coal-mining district 50 miles northwest of Des Moines. Here, "where the tall corn grows" above the ground and black diamonds beneath, little red-haired Davie grew to boyhood and manhood.

He began to acquire the three R's at the Angus district school the same year that a clever young attorney, named Albert Baird Cummins, moved from Chicago to Des Moines to practice law. College educations were not in style in western Iowa at that time. The Goliath of Want was threatening the Davis household, and, like his biblical namesake, the boy David came to the rescue. He left the shanty schoolhouse at 12 to work in the coal mines and help support his family. Like Lincoln and Edison and other notable Americans, he continued to educate himself in the spare moments that many boys fritter away. From this self-training he acquired an understanding of the value of education which served him well when later he became a trustee of Gooding College in Idaho.

Forced by circumstances to become a breadwinner at 12, the boy miner early developed a bump for business. From trading jackknives with his companions between shifts, he graduated to selling codfish and calico in a country store. The customers liked him and he advanced in the esteem of his employers and the community. Leaving the store, he became manager of a farmers' cooperative emporium, and in 1899, at the age of 26, we find him in the cashier's cage of a bank at Rippey, Iowa.

Then a cloud appeared on the Davis horizon: The cashier of the Bank of Rippey had

a dynamo too big for his motor. In other words, he had more energy than physical stamina. The rough, insanitary life of the mines had retarded development of a body naturally frail, and years of hard driving on the job at hand finally broke down that body. In 1905, in search of health, Davis reluctantly left the coal and corn of the Hawkeye State in a covered wagon headed for the great Northwest.

Desert air and sunshine worked wonders on the constitution and by-laws of the Iowa emigrant. In 1907 he established the First National Bank of American Falls, Idaho, and this place has since been his home. From here his rise has been rapid.

David W. Davis went up to the executive mansion at Boise in 1919. He had served in the State senate as a leader, had been active in war work, and his influence in banking circles had elevated him to the presidency of the Idaho State Bankers' Association. He enjoyed a wide reputation as an able executive, and was elected on a platform pledging a business administration.

Political platforms are frequently referred to as devices to get in on. A party platform without a plank pledging economy and good business service would be like apple pie without cheese, or a movie thriller without hokum. It isn't done that way in correct political circles. As to delivery of the goods after election, that, of course, is an animal of another shade.

But the quiet Methodist banker from American Falls meant exactly what he said when he told the voters of the Gem State that his particular business plank was not a decoy to catch the moron vote. In other words, when he talked business, he meant business.

The boiling of the Idaho political pot had in the course of time brought forth a motley set of half a hundred boards and bureaus to administer the affairs of the Commonwealth. The statehouse was enlarged to hold them, and then they overflowed into the backyard. Their functions collided in a manner painful alike to the efficiency expert and to the taxpayer. But they belonged to the established order, which, as all students of history know, is an order of stubborn persistence.

It is now generally recognized that the "board of directors" of eight men, which Governor Davis caused to be substituted in place of 49 varieties of commissions and bureaus, was an act of genuine statesmanship. And this was only one of many things he did to make the ship of state shipshape. The people of Idaho called him to lead them a second time, and were it not for an unwritten law against a third term, quite likely

he would to-day be in the capital city where the syringas bloom.

Governor Davis possesses in a large measure three cardinal virtues—simplicity, honesty, and courage. He is as democratic as his upbringing, as square as Welsh religion, and entirely unafraid.

When the great railroad strike of 1922 was paralyzing the business of the West, trouble loomed big at Pocatello. Ugly threats were made by the strikers who were trying to keep the rolling stock quiet. Politicians feared their ballots and others feared their bullets. But the stocky, square-jawed governor at Boise was as cool as Coolidge. He calmly announced that the operators of the trains would be protected to the limit—and they were. Railroad executives will tell you that in no State was the situation better handled than in Idaho.

Back in the nineties when Davis was in charge of the Bank of Rippey, S. Wesley Johnson owned the Commercial Bank across the way and his young daughter Nellie helped him balance the books. Students of Main Street might surmise that Davis and Johnson did not sing from the same hymnal in the weekly services at the village church. Such surmise would be correct as to a certain early period, but through the diplomatic efforts of the genial young Welshman, the Bank of Rippey and the Commercial Bank were finally wedded into one, and then Nellie Johnson and David W. Davis followed suit.

Mrs. Davis was educated at Hillsdale College in Michigan and is a member of the Kappa Kappa Gamma Sorority. She is a modest, charming woman, the mother of three interesting children. The Davis home life is ideal, and the governor gladly gives to his better half a large measure of credit for his success.

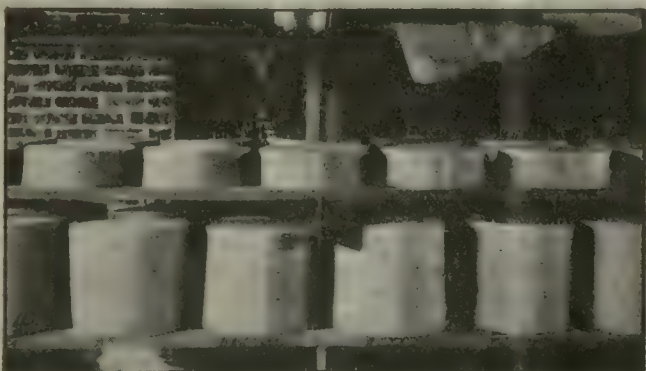
Davis has for years been interested in the irrigation of arid lands, and it was this interest which led him to organize the Western States Reclamation Association, made up of representatives from 15 of the arid States of the West, and having as its object the education of the country to the need of Federal reclamation. Because of this intimate knowledge respecting irrigation and western conditions, Secretary of the Interior Hubert Work appointed Davis first as his special assistant and later as Commissioner of the National Bureau of Reclamation.

Here endeth for the present the story of the immigrant baby with red hair, who came from Wales, and under many handicaps and through his own efforts, rose to high places of trust and honor, to become an inspiration to the youth of America.



MAKING CHEESE
ON THE
MINIDOKA PROJECT
IDAHO

- 1 HERD OF E. L. A. RUE, NEAR RUPERT
- 2 RUPERT CHEESE FACTORY
- 3 HOLSTEIN HERD OF GEORGE BREAZEL
- 4 BURLEY CHEESE FACTORY
- 5 HERD OF J. H. WARD, ALLEN, NEAR BURLEY
- 6 PAUL CHEESE FACTORY
- 7 VATS IN BURLEY CHEESE FACTORY
- 8 HOLSTEIN HERD OF DAD HAUSEN
- 9 ACECA CHEESE FACTORY
- 10 CURING CHEESE IN BURLEY FACTORY
- 11 H. C. HAUSEN & HIS PRIZE HOLSTEIN BULL



CHEESE FACTORIES SUCCEED ON THE MINIDOKA PROJECT.

High freight rates have resulted in establishment of dairy industry on the project as a means of making a profit from the large hay crop. Creameries and cheese factories point the way to ready cash for progressive water users.

IT has long been recognized that the Minidoka project offered unusual facilities for dairying and almost from the very inception of the project the farmers have been urged to "get into the dairy game." There were a number of fundamental reasons why dairying promised success: The acreage of alfalfa hay has always been relatively large, ranging from 30 to 40 per cent of the total cropped area of the project. The quality of the hay is good and when fed to dairy cows produces a heavy flow of milk and high butter fat test. Probably the most potent argument in favor of the case is the matter of freight rates. Except when prices for hay have been abnormally high, freight charges have been such as practically to prohibit shipments and the farmers have turned to dairying as a means for using up their hay crop at a profit.

Creameries and cream-buying stations were early established to handle the milk and cream produced on the project. There were some 10 or 12 of these. No big campaign was put on to work up the industry, yet the number of dairy cows increased steadily. Thus in 1911 the number of dairy cows was less than 2,000, but by 1916 it had grown to 7,300. After some reactions against dairying during war and post-war years, dairying is again gaining in popularity. Dairy cows to the number of 7,223 were found by the 1922 census. Many heifers of excellent breeding have been brought to maturity during 1923. Few cows are being imported, the natural increase being largely depended upon to build up the farm herds.

In 1915 the first cheese factory on the project was built at Acequia. A number of farmers in the vicinity of that town formed a corporation called the Acequia Dairy & Produce Co., erected a building, hired a cheese maker, and began bringing in their milk. There was an immediate demand for the cheese, greater than could be supplied, and for a time the enterprise thrived. In November, 1915, the factory received 69,000 pounds of milk from which about 4 tons of cheese were made. The milk receipts continued to grow so that during June, 1916, they amounted to 81,500 pounds, an output of 9,100 pounds of cheese. The factory has been operated continuously up to the present time, but until recently its business has fluctuated a good deal, owing to the fact that it paid no more for milk than did the creameries; hence the creameries received a large share of the milk.

In 1922 the H. F. Laab Co., of Wisconsin, who are large cheese makers of that State, made a thorough investigation of the possi-

bilities of the cheese industry in Idaho. As a result of that investigation the company has established four factories on the Minidoka project. The first of these was at Rupert and was started on February 15, 1923, in a building formerly used for a creamery. The first day 1,946 pounds of milk were delivered at the factory. By March 1 this had increased to 4,651 pounds and the success of the factory was assured. This plant has already had to double its capacity.

The factory at Paul started on February 26 in a building that had been erected some years previously for the same purpose. The milk receipts when the institution reopened were somewhat less than at Rupert, being about 1,800 pounds the first day, but the growth of the business was immediate and constant.

The success of these factories on the Gravity division aroused so much interest that the farmers of the South Side Pumping division arranged for factories at Burley and Declo, both of which opened for business on July 1. At Burley a commodious brick building, about 20 by 50 feet in size, was erected for the use of the factory, but at Declo a vacant store building was leased and fitted up. On its first day the Burley factory received 600 pounds of milk and the factory at Declo somewhat less than that amount.

By the end of September, 1923, the daily receipts at the various factories had grown to the following: Acequia, 7,000 pounds; Rupert, 6,500 pounds; Paul, 5,500 pounds; Burley, 8,000 pounds; and Declo, 6,500 pounds. This is the "off season" for milk cows, so the figures given are somewhat less than they were a few weeks earlier or than they will be in the near future. The Burley factory has added a second vat, thus nearly doubling its capacity. The product of all the factories is collected at Paul, whence it

is shipped, part of it going to Pacific coast points and part to Chicago. One carload, or about 20 tons of cheese, is being shipped each week.

It is interesting to note the rise in the price of butterfat since the cheese factories were established. When the Burley plant was started it paid 48 cents per pound for butterfat, while the price at the cream-buying stations was 35 cents. At present the factory price is 52 cents, while the creameries are paying 45 cents. As a rule there has been a difference of about 10 cents in the prices paid by the two lines of industry. The total amount paid out to the farmers by all the factories is now about \$800 per day. In addition the farmers get back the whey from their milk, which makes excellent feed for hogs.

Probably the largest single delivery of milk is that of two Swiss brothers named Giessler, who live near Acequia. These men milk 18 to 20 cows and have an income of \$250 to \$275 per month. Mr. E. L. Rigg, of Rupert, is another large producer. Mr. Rigg has 10 cows. His returns have varied from \$90 to \$185 per month. Just now he is beginning to dry up his herd preparatory to their freshening in December. He has two cows that, when fresh, yield 57 and 55 pounds of milk, respectively, per day, with an average test of 4 per cent butterfat.

At the Burley factory the largest patrons are Mr. Levi Savage and Mr. J. Howard Allen. Mr. Savage brings in about 250 pounds of milk per day, which yields a return of about \$150 per month. Mr. Allen's deliveries run from 250 to 300 pounds per day, with a revenue of \$150 to \$175 per month.

Before establishing a factory on the project a representative of the H. F. Laabs Co. met with the farmers and explained that he would require a guaranty of the milk from 300 cows for not less than one year in order to start. The company is confident that, after one year's trial, it will have demonstrated so thoroughly what it can do there will be no lack of patronage. It pays the same price for butterfat that is paid at Plymouth, Wis. The company hires trucks for bringing in the milk to the factory each morning, and for this service a charge of 20 cents per hundred pounds is made. This charge is deducted from the farmer's check at the end of the month.

There is little doubt that the cheese factories are permanent fixtures of the communities which they serve on the Minidoka project. It seems equally certain they will continue to grow and that the dairy industry will become of increasing importance to the farmers as they realize the benefits to be obtained from it.

CREAM CHECKS BIG ITEM HERE

The president of the Yakima Dairy-men's Association, Yakima project, Washington, gave the members of the Sunnyside Commercial Club some interesting figures recently, calling particular attention to the fact that a few cows on every farm in the Yakima Valley are a necessity.

The Sunnyside plant in 13 days paid out to the farmers \$4,111 and in the same number of days sold, each day, 240 pounds of butter. The association has 700 producers and is in good shape.

BUSINESS METHODS FOR MARKETING POTATOES SUCCEED.

The same methods that have been used so successfully in marketing the citrus fruits of California to be applied to potatoes—Present "dumping" system to be eliminated as far as possible.

A MOVEMENT has been started among the potato growers of southern Idaho, called the Potato Growers' Cooperative Association, that promises to be of real benefit to the farmer in marketing his potato crop. The selling methods that have hitherto prevailed in selling Idaho's potatoes, and the small returns received for them, have convinced the grower that he was not getting a proper share of the "consumer's dollar."

Many schemes have been suggested and some of them tried for handling the farmer's potatoes, but they have usually resulted unsatisfactorily, if not disastrously. Potatoes shipped on consignment have often not only yielded no return to the grower but have resulted in a bill for freight charges. The cost of shipping and handling the potatoes was greater than their gross selling price. Owing to these discouraging conditions, it is estimated that fully 1,000 acres of the 1922 crop on the Minidoka irrigation project were not harvested, while thousands of bushels that were harvested were not marketed.

Leading growers realized that the potato industry was considerably demoralized and that an improved plan for marketing the crop should be adopted. Accordingly, the organization already mentioned has been formed, the purpose of which, according to the articles of agreement, is for "promoting and encouraging the business of marketing potatoes cooperatively; for reducing speculation; for stabilizing potato markets; for cooperatively and collectively handling the problems of potato growers; and for other pertinent purposes."

The plan of the organization is that developed by Mr. Aaron Sapiro, of California, and used successfully by the citrus-fruit growers of southern California, the egg raisers of northern California, the tobacco and cotton growers of the South, and other similar industries. Its principal aim is the orderly marketing of potatoes, as opposed to the so-called "dumping" system now in vogue. The plan provides for the formation of a nonprofit association in each county where there is a sufficient acreage of potatoes, and every potato grower is eligible and is invited to join. The affairs of the association are controlled by a board of five directors, elected annually. When five of these associations were formed they organized a central body known as the Idaho Potato Growers' Exchange, with headquarters at Idaho Falls. There are now nine associations in the exchange. The exchange acts as the agent for the various associations and arranges for collecting, grading, shipping,

financing, and marketing the potatoes. It is not expected that the exchange will be able to establish a sales force for this year, owing to the lateness of organizing, so it is probable that a contract will be made with some large selling agency to handle the 1923 crop. This has been done already in Colorado. When the plan is fully worked out a representative of the exchange will be located in each of the principal potato markets of the country who will watch carefully the market conditions there. By means of frequent reports received from these representatives the exchange will keep in close touch with all the markets, and potatoes will be shipped only to those places where the demand is sufficient to absorb the shipment without glutting and where a fair price will be received for them.

THE LATE SPUD.

The chief advantage of the late potato over its earlier brethren is its keeping quality, which permits its sale and use all winter and through the early summer the following year. This involves special methods. The whole question of successful late-potato marketing can be summed up under four heads. They are: (1) Careful planning from planting time to day of sale; (2) full use of crop and market news; (3) good handling, grading, and loading; and (4) readiness to learn from the methods of other potato-growing sections.

An important feature of the plan is the provision for grading and pooling the potatoes. All potatoes, as soon after digging as possible, are strictly graded and all those of the same variety and grade are pooled. Each grower shall deliver potatoes to the association at such times and in such quantities as the association directs, but proceeds from the sale of any potatoes are prorated over all potatoes in the pool. When all potatoes are sold, which will probably be in May, a final settlement is made and each grower is paid for the potatoes he delivers of each grade, at the average price received during the entire season for potatoes of that grade.

To carry out the plan successfully, it will be necessary that a large part of the crop be stored for some time until it can be marketed profitably. Accordingly, the plan provides that each county association may arrange for such storage, either by leasing or building warehouses for this purpose.

A fee of \$5 is charged each member when joining the association, which is used to pay the expenses of organization, printing, advertising, etc. The term of the contract, which each member must sign, is for five years. There has been some criticism that this is too long a time, but experience has shown that a less time is insufficient to get the organization thoroughly established and prove its worth. Officers of the association assert that when it is in good running order the operating expense will be very small, not more than \$10 to \$20 per car. Under the present plan of selling by consignment, a charge of some \$35 to \$40 per car is made for this service.

The contract further provides that before it shall become effective at least one-half of the total acreage grown for commercial purposes in Idaho in 1921 shall be signed up. That year's crop was used as a basis because it was more nearly the normal acreage than the crop grown in 1922.

Up to September 20, 1923, it was estimated that from 55 to 60 per cent of this acreage had been covered by contracts. In Cassia County, principally on the South Side Pumping division of the Minidoka project, about 210 contracts, representing some 2,500 acres, had been secured. New contracts, however, are being received daily. On the Gravity division, in Minidoka County, not so much progress had been made and only about 30 farmers had accepted the contract, but it is expected that by the time potatoes are harvested from 1,000 to 1,500 acres will be included in the association. The total 1921 acreage was 3,533 acres on the Gravity division and 6,693 acres on the Pumping division. The 1923 acreage will approximate that of 1921.

The nine counties that have so far been organized include practically all of the late potato-growing sections of Idaho, except Banrock and Twin Falls Counties, and it is believed these counties will both organize at an early date. By 1924 the early potato section in the vicinity of Caldwell will very probably be included also.

The organization expects that, in another year, it will have its own sales force established over the country and the full benefits of its plan of operation will be felt. No other marketing plan hitherto proposed has aroused so much interest among the potato growers of the Minidoka project as this has done, and none has offered such attractive features. Similar organizations have been completely successful in other parts of the country and the supporters of the proposed plan assert the potato crop of southern Idaho can be handled with equal success.

FROST HANDICAPS FARMERS ON NORTH PLATTE PROJECT.

Blight, grasshoppers, and other pests cause setback to agricultural development, although there are bright spots in the revival of hog raising and the dairy industry.

FARMERS on the North Platte project in Nebraska and Wyoming passed through a most trying and unusual crop season, says B. J. Seger, secretary-treasurer, North Platte Valley Water Users' Association. A late frost in the spring froze the beets, and later heavy winds cut the beets off so that some farmers replanted beets the second and third time. Later frequent rains interfered with the weeding and cultivation of the beets, but in spite of these handicaps there were 12,000 acres of beets which are making in most instances a very satisfactory yield.

There are approximately 90,000 acres under cultivation on the North Platte project this year. Approximately one-tenth of the acreage was planted to potatoes, which early in the season promised to be an excellent crop. More care than usual was used in the selection of seed, a good many using certified seed, but on account of frequent rains most of the potatoes blighted and the crop of marketable potatoes will be small. While the price is better than last year, it will not affect the low yield.

A little better than one-fourth of the total acreage is in alfalfa. The late season and the rains retarded the early hatching of hoppers—a month later than the previous years. This gave new alfalfa seeding a splendid start, with a result that practically all who sowed alfalfa were able to bring the new seeding through the season in good shape. Alfalfa made a splendid growth on account of abundance of rain, but a very small per cent was put in the stack without getting wet, so the quality is not as good as usual.

A larger acreage of corn was planted this year than usual—about 19,000 acres—and this crop is unusually good. Small grain has never been a money-making crop on this project, and this year those who had wheat suffered more or less loss from black rust. The damage from hail this year did not extend over a large area on the project. Approximately 10,000 acres were hailed. One district, known as Nine Mile District, comprising approximately 7,000 acres, had three severe hailstorms during the season, which practically wiped out the crops for that region except a small tonnage of alfalfa.

A good many farmers seeded sweet clover with grain and thereby obtained a lot of good feed, especially good for milk cows. It is found that stock will seldom bloat on sweet clover, while it is almost impossible to pasture alfalfa for that reason. It is not difficult to secure a stand of sweet clover, as the grasshoppers do not feed on it. Sweet clover is proving to be a splendid soil builder. It enriches the soil as much in two years as al-

falfa does in four. It is especially adapted to the lighter soils.

INTEREST IN DAIRYING INCREASING.

A good indication of future prosperity for many of our farmers is the increase in the number of dairy cows and poultry over previous years. That more interest is being taken, especially in dairy cows, is shown by the fact that a committee of five, including the county agent, made a three weeks' tour by auto through the dairy sections in Wisconsin, Michigan, and Iowa. The business men of the towns of Scottsbluff, Gering, Mitchell, Bayard, and Minatare, the Great Western Sugar Co., and the water users' association furnished the funds for the expenses of this committee. Four banks at Scottsbluff, three at Mitchell, two at Gering, one at Morrill, one at Minatare, and one at Melbeta financed the buying of two cars of good grade Holstein and Guernsey 2 and 3 year old heifers. The members of the committee were strong for the dairy cows for the North Platte Valley after seeing the evidence of prosperity in regions where it would have been impossible for the farmers to have prospered without the dairying industry. There are still many of our project farmers who do not realize the importance of having a herd of good cows. There are many who are not in financial condition to buy cows or to build adequate shelter for them. Those farmers on the project who were hailed out three times happen to live on lands which are, for the most part, of uneven topography or light soil, and are located the farthest from market. Alfalfa and sweet clover, corn, and some small grain, combined with 5 to 10 milk cows, together with hogs and poultry, would eventually mean success for the industrious farmer on these lands. These farmers, however, are the least able to purchase the stock needed and provide necessary shelter. Some plan should be worked out whereby worthy farmers who have exhausted their credit at the banks could have financial aid in the purchase of cows.

GETTING RID OF THE HOPPERS.

But little progress has been made in the past year in pest eradication. The association expended \$2,180.50 in payment of gopher bounty the past season. It is realized that a more thorough system must be adopted if we are to rid the project of this pest. The paying of bounty is a help but has not proven satisfactory. The grasshoppers did not do as much damage to the crops this year on account of late hatching, and for that reason only about half as much

poison bran was put out this year as the year before. Mr. Lockwood and Mr. Udine, representatives of the United States Agricultural Department, spent about two months on the project, running experimental tests on several of the farms which have been infested with grasshoppers for several years. These farms were thoroughly cleaned of hoppers. The farmers were urged to form groups, secure the ingredients, and mix their own poison bait. By so doing, it would be much cheaper than to buy the poison ready mixed. It is difficult to receive the hearty cooperation of all the farmers on the project in mixing and spreading poison for the reason that a large per cent of our farmers are tenants, many of whom do not expect to stay more than one year on a place. This project needs more landowners who are real farmers and who live on their farms.

The United States experiment farm, which is under direction of Mr. Holden, is proving to be a wonderful asset to our project as well as other parts of the county. A picnic was held at the experiment farm August 2 and there were about 2,000 people in attendance. Great interest was shown in the experimental plots of beets, potatoes, and sweet clover. A special feature this year was the boys' and girls' calf and pig clubs. Much interest was shown by the young folks as well as older people. Mr. Propps, who has charge of the dairy and stock at the experiment farm, has done splendid work the past year in spreading among the farmers the gospel of milking cows, raising hogs and poultry.

SEASON'S BRIGHT SPOTS.

The bright spots in the season just past are the revival of the dairy industry and hog raising; the number of farmers who are buying ewes for breeding purposes and wool; roughage on the farm which would otherwise go to waste furnishes 50 per cent of feed for ewes; more poultry, for the double purpose of food and for helping in the extermination of grasshoppers; the added acreage of new alfalfa and sweet clover; and the fact that a great number of our farmers are trying to carry out a more careful system of rotation and diversification of crops than ever before.

Wool is produced in every State in the Union. In 1922 production totaled 219,095,000 pounds, not including pulled wool. Wyoming and Texas produced the largest quantities and Delaware the smallest quantity of any State that year.

EVILS OF WASTE OF WATER AND HOW TO LESSEN THEM.

The amount of water to apply in one irrigation, the length of the interval between irrigations, and the total quantity used in any one season all depend on a large number of soil, crop, and climatic conditions.

"**M**ANY of the evils resulting from an excessive use of water are obvious to the most careless water user," says Mr. Allen L. Darr, in a recent issue of the *Irrigation Review*. "But other events are taking place below the surface of the ground that are not detected by direct vision, and are more important to combat for that reason. Thus the farmer who pays according to the amount used knows that wasted water means wasted money as well as a possible shortage later to himself or to others. The average man can see directly the evil effects of wasting water on the highways, in drainage canals, or on his neighbor's lands. Less tangible is the effect

certain rights may be lost unless the total amount available is actually run over the land. Governed by this motive irrigators often actually waste water to their own detriment as well as to the detriment of others in the belief that they are perpetuating their water rights. But by far the greater amount of waste is due to ignorance or to carelessness in the handling of the water."

Dr. John A. Widtsoe, one of the special advisors on reclamation appointed recently by Secretary of the Interior Work, in his book on *Irrigation Practice*, refers to the loss from excessive irrigation as follows:

"Water is lost by seepage on the farm itself, for the common practice is to irrigate

the standing water table. The loss of water due to excessive use of the water on the farm is often very large. It may safely be estimated that one-half of the water taken in at the head gate of the canal is lost by percolation from canals, ditches, and excessive irrigation. This is an awful waste when the great cost of irrigation structures and the vast areas of arid land are considered. The old idea that irrigation should take the place of tillage must be fought vigorously."

Various sources of water loss and methods of remedying these losses are given in *Farmers' Bulletin 864* of the Department of Agriculture, as follows:

"*Loss by absorption and seepage.*—The quantity of water which plants use forms but a small part of that which is diverted from streams for irrigation purposes. Large volumes are lost by absorption and seepage in the earthen channels of canal systems. Similar losses occur in the ditches which supply farms, and a large part of the remainder is wasted in irrigating crops. The farmer is chiefly concerned in lessening the waste of water in his supply ditch and on his farm. In localities where water is scarce the supply ditch should be made water-tight. This may be done by lining the channel with cement concrete, cement plaster, asphalt, heavy crude oil, or clay puddle. Flumes or pipes may also be used as a substitute for an earthen ditch.

"*Loss from faulty preparation of surface.*—One of the most common sources of loss of water is poor preparation of the surface. When the soil is irrigated by flooding from field laterals an uneven surface causes needless waste of water, extra labor in spreading it over the surface, and smaller yields. The water flows into the low places, which receive too much and may become water-logged, while the high places are left without water and the crop thereon is dwarfed. The surface between field laterals should be so evenly graded that water will flow in a thin sheet over the entire surface, the excess being caught up by the lower lateral.

"*Loss from neglect.*—Another common cause of waste is the lack of attendance. Water is often turned on a portion of a field and permitted to run without attention for hours and even days. On some farms irrigators look after the water for 10 hours and turn it loose for the balance of the day. Under this practice the low places receive too much, the high places little or none, and a large part flows off the field to the injury of the roads and adjoining farms.



Irrigating a young crop by the furrow method. Note the supply ditch in the foreground and the furrows leading from it across the field. To secure even distribution and to prevent loss by seepage, in sandy soils the furrows are short and the head of water large; on clayey soils the furrows are long and the head of water small. In proper furrow irrigation, the water should not flood the ridges, and little water should waste from the furrows. When the lower ends of the furrows are thoroughly wet, the water is turned into another series of furrows.

of the more remote danger of wasting water through his own soil by percolation, which not only tends to carry away what may be called the fertility of the soil, by carrying away in solution valuable earthy salts or plant food, but may raise the water table so near the surface that the elements of fertility that remain in the soil and are necessary to maintain plant life are no longer available for their use.

"It is unfortunate but true that the tendency among irrigators is to apply too large an amount of water to the land. They are actuated in part by a feeling that they are entitled to a certain amount, and believe that for some reason this is the amount that should be applied. Often it is felt that

land too heavily. When more than 5 inches of water are added to the soil in any one irrigation, there is usually a loss by seepage; yet, on a great many farms, twice that much water is applied at one irrigation, providing it is available and the soil can be made to absorb it. Evil follows such excessive irrigations, especially if they succeed each other at short intervals. Farmers who misunderstand the use of water usually apply as much as possible, as frequently as possible, and urge upon the canal managers the necessity of having free access to water. An irrigation applied to the soil before the plant roots have had time to remove the water added in the previous irrigation retards the growth of the crop and soaks down the soil to increase

THE HAY STACKER IS A VALUABLE FARM ADJUNCT.

With nearly 40 per cent of the cropped area of the projects planted to alfalfa, every facility for handling the crop should be known—Two types of hay stacker are described in the following article.

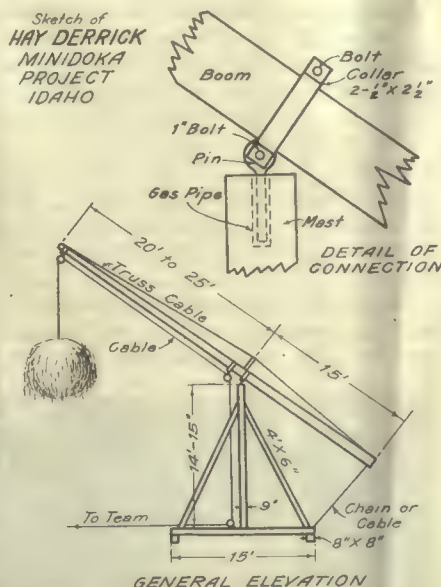
IN the RECLAMATION RECORD for August there was printed an illustration of a hay stacker in use on the Minidoka irrigation project in Idaho. This excited the interest of Mr. C. Zahniser, of Glen Ranch, Montrose, Colo., on the Uncompahgre project, who asked for details of its construction. These have been furnished by Mr. S. H. McCrory, Chief of the Division of Agricultural Engineering of the Department of Agriculture, and are printed below for the information of others who may be interested.

The boom stacker can be made of any desired size. It is suggested that a 35 to 40 foot pole, 6 to 8 inches in diameter at the top, may be used for the mast. The skidsshould be about 14 feet long and of 4 by 8 or 10 inch timbers. The cross beams, of 4 by 6 or 8 inch material, should be halved into the top of the skids and bolted to them with one-half or five-eighths inch bolts. The legs of the base may be of 6 by 6 inch material, long enough to make the base about 10 feet high. The legs are cross braced with well bolted 2 by 6 inch members. At the top the legs should be secured with heavy strap iron and bolted to the head, which may be made of two 2 by 12 inch pieces notched around the mast and with heavy battens across the ends.

The mast is kept upright by means of guys which may be of one-half inch wire cable or three-fourths inch diameter rope. At least three guys are required, and they should be so placed as to form an angle of from 45 to 60 degrees with the mast. Each guy, at 60 degrees, for a 35-foot mast would require approximately 60 feet of rope, exclusive of the anchorage.

The boom may be about 24 feet long, 4 to 6 inches in diameter, and may be fastened to the mast by means of a two-piece clamp made of one-half by 3½ inch metal. Two legs of the collar should be about 1½ inches longer than the other two, so as to receive an eye plate at least 1 inch thick. The larger end of the boom should be slightly beveled and bolted to a heavy metal fork, which may be made of two straps properly shaped and bolted to the eye plate, thus forming a hinged joint between the boom and the mast. The collar of the mast may be adjusted as to height, but should not move when the stacker is in operation.

In the illustration mentioned an ordinary hoist block and tackle is used to support the outer end of the boom from the top of the mast. With such an arrangement one-half inch rope would serve. The sheaves of the blocks should be at least 6 inches in diame-



ter, but 8-inch sheaves would be easier on the rope.

The mast is braced with one-half inch cable fastened just above the base to a strap iron collar and at the top to a heavy eyebolt. The strut under the brace is about 12 to 16 inches long, the base of the strut being secured to a metal plate which, in turn, is attached to the mast. The top of the mast is bound with a metal collar 2 or 3 inches wide to which is attached a hook for fastening the tackle. The guys are secured to a heavy pin in the top of the pole.

It would require about 125 feet of one-half inch diameter rope for the tackle supporting the outer end of the boom and approximately 100 feet of one-half inch steel cable or three-fourths inch rope for the lower tackle.

Mr. Dana Templin, of the Minidoka project office, has furnished the following

RECLAMATION RECORD COVERS TWO MONTHS

The attention of readers of the RECLAMATION RECORD is called to the fact that this issue of the RECORD is dated November-December, and that the next issue will be dated January, 1924. This change has been made in order to conform more nearly to the general practice followed by similar publications, so that the current issue will hereafter bear the date of the month in which it is received on the projects.

description of another type of hay stacker, or derrick as it is more frequently called, which is used on the project:

This derrick consists of a base about 15 feet square, with an 8 by 8 inch timber on each side and a middle timber of the same size on which the mast rests. The timbers are all bolted together where they meet.

The mast is usually a round pole 9 or 10 inches in diameter and 14 or 15 feet high, which rests on the middle timber of the base. To hold the mast in place, it is fastened to the timber by a dowel pin which extends some 4 inches into the timber below and the same distance into the mast above. A 4 by 6 inch brace comes up from each corner of the base to the mast, a foot or two from the top of the mast, and to which the braces are bolted.

The boom is generally about 35 to 40 feet long, with a diameter of about 5 or 6 inches at the small end and 8 or 9 inches at the large end. It is placed directly over the top of the mast at a point about 15 or 16 feet from the butt end of the boom. The boom is surrounded by a collar made of two pieces of one-half by 2½-inch iron bolted together at the top and bottom so as to clamp tightly about the boom. A piece of 1½ or 2 inch gas pipe is set down 8 or 9 inches into the top of the mast and a 1 or 1½ inch pin, the upper end of which is flattened out and a hole bored in it, is placed in this pipe. A 1-inch bolt passes through this pin hole and through the lower part of the collar pieces just described, thus forming a hinge on which the boom can move up or down, while the pin working in the gas pipe permits the boom to swing laterally.

Sometimes the boom is trussed with a three-eighths inch cable fastened at the two ends of the boom and bearing on a short 4 by 4 inch post set directly above the top of the mast. The butt end of the boom is held down by a chain, rope, or cable that is fastened to one of the timbers of the base or to the bottom of the mast.

In operating the derrick a three-eighths inch single cable is generally used. It runs over a pulley near the top of the boom, another pulley fastened to the boom just ahead of the mast, and a third pulley on one of the base timbers. Most of the farmers on the Minidoka project use round timbers for the mast and boom, which they get from the hills. Any blacksmith can make the collar and center pin described. The only other material necessary to buy includes the cables, pulleys, and timber in the base and braces.

This type of derrick is shown in the accompanying illustration.

CONSTRUCTION OF THE THOMAS POINT PUMPING PLANT.

The construction of the Thomas Point pumping plant on the Lower Yellowstone irrigation project, in Montana and North Dakota, provides a means for irrigating approximately 2,400 acres of land.

THE Thomas Point pumping plant is situated on the main canal of the Lower Yellowstone project, Montana-North Dakota, at the head of lateral KK, about 1 mile north of Savage, Mont. It was built to pump water from the main canal into lateral LL, the difference in water surfaces being 31 feet. The land irrigated consists of a tract lying above the main canal and west and north of the town of Savage, about 1 mile in width and 6 miles in length, and containing approximately 2,400 acres. The main lateral serving this land starts with an 8-foot fill at the top of the bench near the plant and follows along a natural ridge with a gradually reducing fill for $1\frac{1}{2}$ miles. It then divides into two side-hill branches, one running north approximately 4 miles, the other south 2 miles along the west slope of the table. From these two laterals a series of parallel sublaterals run easterly to distribute the water to each farm unit.

The plant was built at the head of lateral KK in order that the waste water from the turbines could be utilized for the irrigation of the 5,000 acres of bottom land under this lateral and thus serve the double purpose of furnishing power for pumping and water for irrigation. A wasteway is provided in lateral KK to take care of the surplus when more water is passing the turbines than is required for irrigation. Likewise a by-pass is provided at the plant to furnish water to lateral KK direct from the main canal when the supply through the turbines is insufficient or the plant is not in operation.

The building is of reinforced concrete 45 feet long by 18 feet wide. The operating machinery consists of two units, each composed of a 110-horsepower horizontal single-discharge spiral-case hydraulic turbine

direct connected to a 20-inch double suction centrifugal pump. The rated capacity of each unit is 20 second-feet with an operating speed of 487 revolutions per minute and 28.2 feet of head on the turbine. Under test one of the pumps actually delivered 25 second-feet against 35.7 feet total head, using 46 second-feet of power water. The performance of the pumping unit under this test is shown in the accompanying diagram.

The intake consists of a concrete head-works equipped with a 4 by 4 foot hand-lift cast-iron gate for each turbine. Two con-

pumps from a steel pressure settling tank located just outside the building. This pressure settling tank receives its water through a 2-inch pipe connected to the steel penstocks. The water in the canal carries considerable quantities of silt, and the pressure settling tank is so designed that the silt will settle faster than the flow of the water through the tank.

A hand-operated 5-ton traveling crane is mounted on a track near the eaves of the building and is available for moving the pumping machinery should repairs be required.



Interior view of Thomas Point pumping plant, showing machinery.

crete pipes 4 feet in diameter and 60 feet in length lead from the intake and connect before entering the building to a sheet-steel penstock which branches to supply water to both turbine and pump.

The penstocks are of riveted sheet steel tapering from 48 inches to 36 inches in diameter and lead from each concrete penstock to each turbine. From each penstock a suction pipe 30 inches in diameter leads to each pump, being gradually reduced to 20 inches in diameter at the pumps.

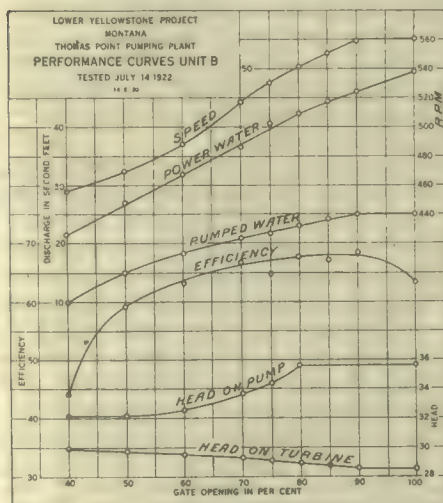
The discharge pipe line consists of riveted sheet-steel pipes from each pump to a common concrete discharge pipe which extends through the canal bank, and joins a 36-inch-diameter sheet-steel pipe line 348 feet long running over the main canal and up on the bench to the head of lateral LL, where it is equipped with a flap valve to prevent back flow when the pumps are shut down.

Clear water is furnished to lantern rings in the stuffing boxes of both turbines and

The construction cost of this plant with building, penstocks, discharge pipe, check, and by-pass complete is as follows:

Building, headgates, check, and by-pass.....	\$18,208.22
Machinery, hydraulic.....	20,035.16
Gates and lifting devices and other machinery.....	1,220.29
Lighting system.....	131.64
Engineering and inspection.....	6,472.00
Total field cost.....	46,067.39
General expense.....	3,790.33
Total.....	49,857.72

During the operating season of 1923 about 2,300 acre-feet of water were pumped at a cost of 9 cents per acre-foot and three-tenths of a cent per foot acre-foot, not including depreciation. No shut-downs were necessary and about the only attention required was a visit morning and evening by the ditch-rider to oil the bearings.



MORE FRESH-LAID EGGS NEEDED.

By the time this article is being read, anticipations of Christmas and the New Year will run at "flood tide." Attendant with these thoughts is the desire to attain greater things in the coming year than have been done in the past. Dream dreams; for the deed is born of the dream, and success comes only to him who plans and dreams. Build air castles, but build only of logic and sound reasoning, and from your deliberated plans will materialize an achievement, says H. O. Numbers, secretary of the Pennsylvania State Poultry Association.

We are now passing through our annual dearth of fresh-laid eggs. This is nothing new, and the same conditions will be experienced as long as the farmers will not specialize in poultry culture. We are beset daily at our farm for "just a few fresh eggs," and the successful poultry farmer has the same requests. We deplore the condition as applied to the consumer who is dependent upon the farmer to supply them, but we have no sympathy for the farmer who has no fresh eggs at this time.

There is no dark secret to be unearthed. The ability to get fresh-laid eggs the year round is simply a bit of applied poultry science. Our colleges and experimental stations are striving to aid the farmer, but if he will continue to turn a deaf ear to their admonitions, he must stand his loss.

Essentially, poultry culture on the farm need not be made foremost in agricultural pursuits, in order to realize a profit. But it must not be classed as a discard. This side-line branch of farming can be developed, and will be developed eventually. Will you kindly follow me in a tentative outline? Assuming that dreams have been dreamed, and conservative plans made, consult your agricultural college for information as to buildings, proper locations, right kind of

exposure, and any other information that would be peculiar to your particular location. For remember this, that the kind of poultry house that I would build up in the mountains would be altogether impractical in a location where climatic conditions would not be so severe; hence the advice of an expert. After you have decided on the proper buildings, figure the cost. "Don't start something you can't finish," and "Don't bite off more than you can chew." Many a man has good intentions and plans, but his purse is flat. So go within your means. Have your buildings completed before you move your birds in.

If you must buy stock, go cautiously. Don't buy the first thing you see advertised. And above everything else, "check up" the integrity of the dealer whom you intend to patronize. Will you let me illustrate? I had been reading with interest an account of a successful man who had made thousands of dollars in the poultry business as a breeder, and to further emphasize the magnitude of this man's success the news articles stated that tons of paper were used annually in the printing of his circulars, catalogs, etc. I took the privilege of calling—unannounced—at his plant. Of course I found a beautiful office, well organized, and saw arrayed in a fine cabinet dozens of cups which represented his winnings at various poultry shows. I announced that I had seen his place in passing, and that I was interested in poultry, and requested "being shown around." After a few questions the proprietor was satisfied that I meant no harm, and condescended to take me out to look over his establishment. We stood on a vantage point where we could see the layout, and in glowing terms he told me of his success. But, I said, where are all your chickens? Rather "sheepishly" and seemingly against

his good judgment he led me to an antiquated shed and opened the door. I had expected to see birds similar to the ones represented in his catalogs, but was sadly disappointed. He explained that his best birds were being farmed out among the near-by farmers, as his business had grown to such a capacity that it was found necessary to adopt this plan. However, in my travels, I found no birds on the adjacent farms that measured up to the owner's declaration. Here is his scheme; he does not solicit personal inspection of his farm, and I felt as welcome as a burglar; he would rather have you look at the beautiful pictures in his catalog, and read the flowery stuff he writes about his birds. He prefers to sell to the fellow a few hundred miles distant, for those are mostly "suckers." Furthermore, do you know that there are a lot of fellows who never owned a chicken, and never will, who are writing lengthy articles on poultry, and are otherwise preying upon the poultry-buying public? The legitimate breeders are trying to weed out these leeches, who make the real product look fictitious. Get your advice from a practical man, or consult your State College extension men. Be sure you are not being "done" when you buy.

Prepare for the coming spring productions. Prepare now. We tried to sound the warning last year to our local breeders to hatch up to their capacity. Some few did, others did not. To-day there is a shortage of pullets to fill the laying pens, and they are selling at a fancy premium. Every year we are consuming more poultry and eggs, and every year we fall short of the supply.

Get started, "for the sake of egg-eating humanity," stop dreaming and get down to business. Put just as many hens on your place as you can conveniently take care of. Attend them in the same methodical manner as you do your cows, your horses, or your crops. Set apart a definite period each day to attend your chicken chores. Forget that it is a job on the farm for the children; it is not; it is a man-sized job, and you will succeed if you will apply yourself.



Link River dam, Klamath irrigation project, Oregon-California.

COTTON FARMER EXPLAINS SUCCESS

TOM WATSON, cotton farmer, came to the Rio Grande irrigation project in New Mexico and Texas two years ago, in a dilapidated auto. To use his own words, he was "flat broke." This year his net income from 100 acres of rented land, west of Canutillo, Tex., is estimated at more than \$7,000. He had 70 acres of cotton and 25 acres of alfalfa. He paid one-third of the crop to the owner.

Soon after his arrival on the project Watson rented an 80-acre farm, which he contracted to work on half shares. His next move was to borrow \$50 from the owner to send for Mrs. Watson and the children.

Let Watson tell the rest of the story in his own words:

"The owner of the land furnished us with credit for food and other necessities until the 1922 crop was harvested and sold. We picked 110 bales from the 80 acres. The lint cotton sold for \$13,500, of which I finally received \$3,500 as my share of the profit.

"There is no question in my mind that the land under the Elephant Butte dam is the best in the Southwest. The entire irrigated area is free from boll weevil and other cotton pests. Labor is more economical, can be had in quantity, and will work on a 10-hour basis. This gives a farmer an opportunity to make more money acre for acre than in any other part of the country I have seen since coming west.

"Farmers in El Paso valleys can not afford to confine their operations exclusively to cotton, because no one is in position to say exactly what buyers will pay for lint. It costs project farmers about 12 cents a pound to raise cotton, and if the price falls below that figure there would be no profit. I believe a farmer should have an abundant supply of milk on the farm, about 100 good laying hens, a few hogs, a home garden, and a family orchard."

Watson said he is preparing to fence the irrigation ditches on the farm this winter to supply pasturage for seven cows and four mules.

Asked to mention some of the outstanding factors in cotton farming on the Rio Grande project, Watson said:

"Cotton is best planted flat, if the land will permit, and should only be planted on beds if the field is excessively rough. Flat planting should be preceded by heavy border irrigation and as soon as possible after irrigation the soil should be double disked to form a fine mulch. I recommend that 35 pounds of seed be planted per acre

in a standard width row. The seed is covered not to exceed three-fourths of an inch with soil and if the field has been dried out by excessive wind it will be necessary to furrow out the rows with a cultivator to moist soil or, say, to a depth of about 3 inches.

"The seed is then planted in this furrow and as before it should not be covered over three-quarters of an inch with soil. If it is planted on the bed the ridges should be dragged nearly down to the leaves and planted shallow as directed.

"My cotton was cultivated seven times this year and irrigated twice. The first irrigation came after July 5 and was followed a month later by a second irrigation. Nine out of ten farmers overirrigate cotton. They say they can not stand to see the cotton suffer. The trouble with them comes up in two ways. First, if cotton is started out while young with overirrigation, its root system will never have a chance to develop as it normally should, deep into the ground. The result is that as soon as water is withheld it will suffer. It is a matter of starting out right.

"In the second place if a cotton crop is not kept free of weed growth the soil moisture will be used to grow weeds instead of cotton and more water will be needed.



The value of cotton and cotton seed grown on the Southwestern irrigation projects in a recent year amounted to nearly \$10,000,000.

"In the event it becomes necessary to irrigate the cotton up, the planting will have to be cross harrowed in order to break the crust for the young plants to come up. Shallow planting is a particular point because many farmers do not realize that cotton, unlike grains, germinates with a large surface leaf which in rising to the surface of the soil is exposed to much friction.

"The best time to plant is between April 20 and May 10. The bulk of the crop is made during July and August and a full crop, under ideal conditions, can be made by planting as late as June 1.

"If the crop can be planted flat in a well disked soil, half the battle is over. The young cotton will come up free of weeds and effective cultivation can be begun immediately. The farmer may silt much of his crop and the weeds will have an even break with the young cotton.

"If cotton is not planted in a standard row, the cultivation implements will not fit and much unnecessary trouble will ensue. Cotton should be thinned from 18 to 24 inches in the row, one plant to the hill as far as it is practicable. A standard rule is, the richer the land the farther apart the plants."

A farmer made a feeding test in which he kept well-bred cattle and scrubs in the same yard, all receiving the same ration. The good cattle fattened while the scrubs remained poor.

The Araby-Yuma Mesa irrigation district, organized under the State laws of Arizona, is arranging to issue bonds amounting to about \$200,000 for power purposes in connection with the irrigation of 17,000 acres of mesa lands, most of which are unpatented.

CROP CONDITIONS ON THE PROJECTS.

THE following is a brief summary of crop conditions on the irrigation projects of the Department of the Interior, Bureau of Reclamation, at the end of October:

Yuma project, Arizona-California.—Cotton gins continued busy. Local estimates of the yield vary from 16,500 to 18,000 bales. Some sales were made at 32 cents per pound, while some growers were holding out for 35 cents. Harvesting of the second alfalfa seed crop was completed, with light yields. The first fall crop of alfalfa hay was about ready for cutting. Some interest was being shown in pecan culture. As a whole, financial conditions on the project were very good.

Orland project, California.—Cutting of the fifth crop of alfalfa was completed, and some lands yielded a light sixth cutting. Oranges were maturing satisfactorily, and it was expected that picking would begin early in November. Shipments of almonds totaled about 410,000 pounds, valued at \$50,000, and almond growers were well satisfied with the yield and price.

Grand Valley project, Colorado.—About half the sugar-beet crop was harvested, with excellent yields. Marketing of alfalfa was under way, practically all being absorbed by local markets. Early potatoes, alfalfa, and sugar beets were the most successful crops, and the season was satisfactory for most farmers. Apple growers were having some difficulty marketing their crop, but as the acreage is small this condition does not materially affect the project farmers.

Uncompahgre project, Colorado.—Harvesting of all crops was practically completed. Prospects were excellent for good yields of sugar beets with a high sugar content. Good yields of onions were obtained, but the price slumped from \$1.75 per hundredweight to \$1.25 at the end of the month. The yield of potatoes was only about 50 to 65 per cent of normal. The price at the end of the month was 60 cents per hundredweight.

Boise project, Idaho.—The third cutting of alfalfa was in the stack. Potato digging and harvesting of lettuce were in progress, and apple picking was at its height. The prices received paid picking expenses and left a small balance to apply on growing costs.

Minidoka project, Idaho.—Rainy weather interfered with harvesting operations, but good progress was made getting out potatoes and sugar beets, about half of each crop being harvested. The yield of sugar beets is probably the largest ever harvested on the project. The yield of potatoes will be somewhat below that of last year.

Huntley project, Montana.—The sugar-beet crop was the best in the history of the project, many fields yielding 20 tons per acre, and some growers reporting much

higher yields. Some damage was done to the bean crop by wet weather in September, but not nearly so much as was at first estimated.

Milk River project, Montana.—Practically all crops were harvested except sugar beets, harvesting of which was about 50 per cent completed.

Sun River project, Montana.—Farmers were engaged in digging potatoes and sugar beets, threshing grain, and in fall irrigating. Yields of sugar beets were fairly good from most fields.

Lower Yellowstone project, Montana-North Dakota.—All crops were harvested with the exception of a small acreage of sugar beets. The yield of this crop, amounting to about 12 tons per acre, was better than anticipated. A final bonus of \$1.58 per ton for the 1922 crop was received by the growers, making a total of \$9.08 per ton.

TWO SPUD GROWERS ON THE SHOSHONE PROJECT

Carl Olsen, a water user on the Shoshone project, Wyoming, has been displaying 21 well-developed potatoes taken from one hill on his farm.

G. V. Davis has been harvesting some of the finest potatoes ever seen—of the Bliss Triumph variety. He recently sold a carload at \$1 per hundredweight. Coupled with the fact that his potatoes yielded more than 200 bushels per acre, they will net Mr. Davis a handsome profit for his labor.

North Platte project, Nebraska-Wyoming.—Wet and cold weather delayed potato and sugar-beet harvest, the roads being so bad that at times it was impossible to haul beets to the dump. About 45 per cent of the crop remained in the ground at the end of the month.

Newlands project, Nevada.—About 1,500 acres of winter wheat were planted. Harvesting of potatoes was practically completed, and in many cases sales were made at excellent prices. Considerable satisfaction was expressed over the returns from the cantaloupe crop. The yield and quality of the apple crop were excellent.

Carlsbad project, New Mexico.—The fourth and fifth cuttings of hay were harvested, but were considerably damaged by rain. The price ranged around \$21 per ton. Cotton picking was in progress; 3,137 bales had been ginned at the end of the month. The maximum price paid was 32½ cents per pound. About 2,250 acres in cotton were practically ruined by a severe hailstorm.

Rio Grande project, New Mexico-Texas.—Cotton gins were being taxed to capacity to take care of the crop and were the centers of activity of cotton buyers and automobile salesmen.

Williston project, North Dakota.—Practically all crops except alfalfa, retained for feed, and vegetables for the local market, had been disposed of, the grain at a loss. Splendid results were obtained from the test plots of sugar beets, the average yield being more than 12 tons per acre, and one plot yielding 16 tons. The sugar content ranged from 14.1 to 17.2 per cent, and the growers have received the congratulations of the sugar company on their results.

Umatilla project, Oregon.—Rains did heavy damage to the third crop of alfalfa. Picking and packing of apples were in full swing. There was little demand for this crop, and most of the apples were being stored.

Klamath project, Oregon-California.—Harvesting of grain and alfalfa was practically completed, and digging of potatoes was in progress.

Belle Fourche project, South Dakota.—The sugar-beet crop was less than 50 per cent harvested, and cold weather delayed hauling from the fields. The yield was satisfactory. The hay crop was severely damaged by rain, and more than 50 per cent will have no feed value in the field.

Strawberry Valley project, Utah.—In general the yield of crops was excellent and prices were fair. All crops were harvested except sugar beets and potatoes. It was estimated that the yield of sugar beets would exceed 100,000 tons. Storage of apples was being contemplated until better prices prevail. The financial condition of the water users was apparently considerably improved over that of last year. Money seemed to be more plentiful and easier to get.

Okanogan project, Washington.—Nearly all the apple crop had been picked, and a large proportion had either been packed and delivered to warehouses or stored on the farm. The market was weak, and the price at the end of the month was not such as to insure the growers much of a net return on the season's work.

Yakima project, Washington.—The greater portion of the apple crop had been harvested and largely stored for better prices. A decrease in the price of potatoes to \$20 per ton resulted in many growers storing their crop.

Shoshone project, Wyoming.—Rains interfered with harvesting operations. At the end of the month about 300 acres of sugar beets were still in the ground. The potato crop was practically all harvested, but owing to the poor market many late potatoes were stored. A large percentage of the third cutting of alfalfa was still in the shock and will be of value only for home feeding. Grain and beans also were damaged by wet weather.

NOTES FROM RECLAMATION PROJECTS

Mesilla Valley farmers, on the Rio Grande project, in New Mexico, have received more than \$250,000 for their cantaloupe crop of the past summer.

Rainy weather on the Shoshone project, Wyoming, so seriously delayed the harvesting of potatoes and sugar beets that it was necessary to utilize a much larger force than usual. The Powell Chamber of Commerce assisted the farmers of the Garland division in getting out all the local labor available, and such employees of the Bureau of Reclamation as could be spared assisted in the work.

The late crop of head lettuce on the Boise project, Idaho, was maturing very satisfactorily, and prospects were bright for a much larger tonnage of better quality than at first estimated.

Cold-storage and packing facilities on the Yakima project, Washington, are being increased. During the past year a plant of 85 cars' capacity was constructed at Tieton City, on the Tieton division, and one of 100 cars' capacity near Sawyer, on the Sunnyside division. The total capacity of frost-proof cold-storage warehouses in the valley is estimated at 4,080 cars.

The first unit of the packing house erected by the almond and orange growers of Orland for their joint use was completed early in October. Other units will be added as required.

The sugar factory at Billings, Mont., has received the first of a number of carloads of sugar beets which were raised on the Milk River project this year. The beets were grown to determine the feasibility of sugar beets as a paying crop on this project. The results obtained from these tests are very promising.

Owing to the unusually large acreage of fall wheat which had been planted on the Newlands project, Nevada, this year, deliveries of irrigation water were continued until November 1, or about three weeks later than usual.

The tenth car of almonds, constituting the final shipment of this year's crop, was forwarded recently from Orland. The Orland almond crop for the year amounts to approximately 408,000 pounds, valued at \$50,000.

The Amalgamated Sugar Co. recently sent out the final payment for the 1922 sugar-beet crop on the Minidoka project, Idaho, amounting to 89 cents per ton, or a total of \$56,000. This makes a total of \$8.39 per ton which the beet growers have received. The original contract price was \$5.50 per ton, with a bonus based on the price for which the sugar sold.

About 33,000 tons of sugar beets were grown on the Lower Yellowstone project in Montana and North Dakota this year, and at the end of October shipments were being made to the Great Western Sugar Co. factory at Billings, Mont., at the rate of 30 cars a day.



Pure-bred hogs are an asset to every farm.

Closing their stores on October 16, the business men of Powell, Wyo., helped with the harvesting of potatoes grown on the Shoshone project. The yield of sugar beets on the Frannie division averaged about 12 tons per acre for the 400 acres planted to this crop.

The 1923 sugar-beet crop on the Huntley project is the best in its history, many fields yielding 20 tons per acre and some reporting much higher yields. Weather conditions were very unfavorable for harvesting the crop on account of so much rain, which kept the roads and fields soft.

The Federal Land Bank of Wichita has loaned the farmers of the Mesilla portion of the Rio Grande project \$315,000, and has under consideration an additional \$326,000.

Huntley project farmers received a final bonus for their 1922 sugar-beet crop amounting to \$1.58 per ton. This makes the price received for the 1922 crop \$9.08 per ton.

In the latter part of October, President Ralph Budd, of the Great Northern Railway Co., together with Vice President L. C. Gilman and other railroad officials, Ward M. Buckles, manager of the Intermediate Credit Bank of Spokane, a branch of the Federal farm loan bank, visited the Milk River project to inquire into and offer assistance in the development of the project and surrounding territory. Particular mention was made of the matter of securing loans from the Federal Government in connection with the dairying industry and the feeding of stock. A committee was appointed to consider the matter and effect an organization if found feasible.

A truck farmer on the Newlands project has produced what is considered a record crop of onions this year on his ranch near Fallon. On a tract of ground which measures nine-tenths of an acre he produced 25.32 tons, which he sold and hauled direct from the field to the buyer's scales, receiving \$40 per ton, a total of \$1,012.80.

Cantaloupe growers on the Newlands project have received settlement on their melons grown this year, which were sold through commission houses. The net returns amounted to approximately 89 cents per crate, exclusive of packing and crates. The yield was low compared to that of last year, owing to the late spring frosts, and one grower, who estimates his net return at \$50 per acre, states that the return would have been doubled with a good growing season.

BUREAU OF RECLAMATION WINS IN SUPREME COURT.

Highest judicial tribunal sustains the constitutionality of the act authorizing the United States to condemn land for town-site purposes at American Falls, Idaho.

ON November 12, 1923, in the case of De Witt Garrison Brown and wife against the United States, the Supreme Court handed down an opinion written by the Chief Justice, which upholds the right of the Government to condemn land for a town site at American Falls, Idaho, in connection with the development of the Minidoka Federal irrigation project. The following is an extract from Chief Justice Taft's opinion:

The plaintiffs in error are owners of a tract of 120 acres, which was the object of the suit by the United States. The jury rendered a verdict of \$6,250 for the plaintiffs, and the court added \$328 as interest at 7 per cent from the date of the issuing of the summons to that of the judgment. The plaintiffs denied the power of the Congress under the Federal Constitution to condemn the land because not taken for a public use. This entitled them to come to this court under section 238 of the Judicial Code.

Plaintiffs' tract lies just outside the present limits of American Falls in Idaho. The town has 1,500 people and is so situated in the valley of the Snake River that three-fourths of the town, or 640 acres, will be flooded by the waters of a reservoir which the United States proposes to create for irrigation of its arid public land by damming the waters of the river.

The sundry civil act of March 4, 1921 (41 Stat. 1367, 1403) appropriates \$1,735,000 in addition to an unexpended balance for the continuation of the construction and extension of the irrigation system called the Minidoka project, "with authority in connection with the construction of American Falls Reservoir to purchase or condemn and to improve suitable land for a new town site to replace the portion of the town of American Falls which will be flooded by the reservoir and to provide for the removal of buildings to such new site and to plat and to provide for appraisal of lots in such new town site, and to exchange and convey such lots in full or part payment for property to be flooded by the reservoir, and to sell for not less than the appraised valuation any lots not used for such exchange."

The United States has purchased 410 acres for the new town site and needs 165 acres more, of which plaintiffs' tract of 120 acres is part. Negotiations for purchase from the plaintiffs failed, as they demanded \$24,000.

The plaintiffs contend that the power of eminent domain does not extend to the taking of one man's property to sell it to another, that such an object can not be regarded as for a public use of the property, and, without this, appropriation can have no constitutional validity. The district court held that the acquisition of the town site was so closely connected with the acquisition of the district to be flooded and so necessary to the carrying out of the project that the public use of the reservoir covered the taking of the town site. We concur in this view.

The circumstances of this case are peculiar. An important town stood in the way of a necessary improvement by the United States. Three-quarters of its streets, alleys, and parks and of its buildings, public and private, would have to be abandoned. The buildings could not be moved except to the gradually rising ground east of the Snake River. There was a bluff 100 feet high on the other side of the river. The tract of 475 acres selected for the new town site was the only practical and available place to which the part of the town to be flooded could be moved so as to be united with the one-quarter of the old town which would be left. American Falls is a large settlement for that sparsely settled country and it was many miles from a town of any size in any direction. It was a natural and proper part of the construction of the dam and reservoir to make provision for a substitute town as near as possible to the old one.

No one would say that a legislative act authorizing a railway company to build a railroad exceeds the constitutional limit by reason of a specific provision that the company may condemn land not only for the right of way but also additional land adjacent thereto for use as borrow pits in making fills and embankments, or for use as spoil banks or dumps for the earth excavated from tunnels and cuts. Such adjacent land would certainly be devoted to the public use for which the railway was being constructed. If so, then the purchase of a town site on which to put the people and buildings of a town that have to be ousted to make the bed of a reservoir would seem to be equally within the constitutional warrant. The purchase of a site to which the buildings of the town can be moved and salvaged and the dispossessed owners be given lots in exchange for their old ones is a reasonable adaptation of proper means toward the end of the public use to which the reservoir is to be devoted. The transaction is not properly described as the condemnation of the land of one private owner to sell it to another. The incidental fact that in the substitution and necessary adjustment of the exchanges a mere residuum of the town site lots may have to

be sold does not change the real nature of what is done, which is that of a mere transfer of the town from one place to another at the expense of the United States. The usual and ordinary method of condemnation of the lots in the old town and of the streets and alleys as town property will be ill-adapted to the exigency. It would be hard to fix a proper value of homes in a town thus to be destroyed without prospect of their owners finding homes similarly situated on streets in another part of the same town or in another town near at hand. It would be difficult to place a proper estimate of the value of the streets and alleys to be destroyed and not to be restored in kind. A town is a business center. It is a unit. If three-quarters of it is to be destroyed by appropriating it to an exclusive use like a reservoir, all property owners, both those ousted and those in the remaining quarter, as well as the State, whose subordinate agency of government is the municipality, are injured. A method of compensation by substitution would seem to be the best means of making the parties whole. The power of condemnation is necessary to such a substitution.

The circumstances of this case are so peculiar that it would not be surprising if no precedent could be found to aid us as an authority. There is one, however, which presents a somewhat close analogy. In *Pitznogle v. Western Maryland Railroad Co.*, 119 Maryland 673, a railroad company condemned a piece of land for its tracks and yards, and in doing so appropriated a private right of way which was the only access of certain other landowners to the public highway. It was held that the railway company could condemn an additional strip of land for a substitute right of way to be furnished to these landowners. In reaching this conclusion the court said:

The condemnation of a part of this land, here sought to be condemned, for a substitute private road or way is incident to and results from the taking, by reason of public necessity, of the existing private road for public use, and the use of it for such purposes should, we think, be regarded as a public use within the meaning of the Constitution.

Our conclusion is not in conflict with that class of cases with which the justices of the Supreme Judicial Court of Massachusetts dealt in the Opinion of Justices, 204 Mass. 607. It was there proposed that the city of Boston in building a street through a crowded part of the city should be given power to condemn lots abutting on both sides of the proposed street, with a view to sale of them after the improvement was made for the promotion of the erection of warehouses, mercantile establishments, and other buildings suited to the demands of trade and commerce. The justices were of opinion that neither the development of the private commerce of the city nor the incidental profit which might inure to the city out of such a procedure could constitute a public use authorizing condemnation. The distinction between that case and this is that here we find that the removal of the town is a necessary step in the public improvement itself and is not sought to be justified only as a way for the United States to reduce the cost of the improvement by an outside land speculation.

SNAKE LOSES HIS HEAD BUT ACCOUNTS FOR DOG

R. S. Lieurance tells of a curious incident on the Klamath project recently. A crew was engaged in locating a canal from the Gerber Reservoir. A rattlesnake crawled out of the brush and his head was nearly shot off by Lieurance. The head was later entirely cut off with an ax, leaving about an inch of neck attached to it. A dog belonging to Lieurance smelled the head and was bitten on the nose. In a few seconds the dog lost consciousness and died in about three hours.

THE PROJECT MANAGER AND THE WATER USERS

ON the occasion of the appointment of Mr. Edward B. Darlington as project manager of the Minidoka project, Idaho, Commissioner Davis wrote to Mr. Darlington calling attention to the ideal relationship which should exist between the project manager and the water users and the project manager and the Government. The sentiments expressed in the letter are of course pertinent to all the irrigation projects and may well serve as a guide to other project managers in fulfilling their duties to the water users and to the Government. The letter, in part, follows:

"Your position will be one of difficulty but the opportunity for service and gratification for the successful execution of responsibility will be proportionate. I am somewhat acquainted with your past experience in irrigation matters and feel sure that you will make a success of this important assignment.

"The project manager occupies a position between the Government of the United States and the water users on the Government project. While he is an employee of the Government and must at all times serve its interests, his work and success are intimately related to the interests and success of the farmers. At times the interests of the Government and the farmers are made to appear conflicting, but in a broad way they are identical because the success of Government reclamation depends absolutely and completely upon the success of the irrigators. We should do everything we can to stimulate that success, and an important element of success in the whole project of Government reclamation work is the repayment to the United States of its irrigation costs. We should cultivate the idea that these costs are expected to be repaid as a matter of course wherever possible; that the contracts with the Government have as much sanctity as those involving payments to any other parties, or even a higher claim, because all values in the irrigated desert are built on the fundamental investment for irrigation.

"The project manager should strive earnestly to maintain the confidence and friendship of the water users. For that purpose and others he should devote a part of his time to getting acquainted. He should be an important factor in sustaining the morale of the settlement and a reasonable attitude toward the obligations to the Government. Somewhat after the fashion of the cashier of a rural bank, he should know the condition of individual farmers, discuss their problems with them, and without prying seek to develop the notion that debts owing the Government should be cared for as due, just as everyone expects

WHAT IS YOUR STATE OF MIND?

The spendthrift is not happy unless he is spending money; the penurious are miserable when they must spend a cent; others are possessed with a "mania for owning things"; and still others through sound management live comfortably and save money.

Thrift is a habit—a state of mind.

To acquire it necessitates breaking the spending habit.

Obviously, if we concentrate on overcoming the old habit of spending, the new habit of saving will take care of itself.

"Penny wise and pound foolish" is not an empty phrase.

Many people when they try to save lose their sense of proportion. They deny themselves the essentials to happiness for awhile and then gratify some passing whim which destroys the benefits of their economies.

If all useless, unnecessary articles purchased by the average man during his lifetime were placed in a pile, they would overshadow his house. If he possessed the money they represented, he would be able to pay off the mortgage on the house.

If you have tried to save in the past without success, approach the thrift habit from a new angle. See how many things you can do without. Don't try to accumulate dollars so much as to avoid accumulating useless junk.

You will then find the dollars in your pocket.

to care for his debts to a bank or other party. We want the water users to pay their bills and we want to help in making them able to pay. Field Commissioner Cannon will have a large jurisdiction in this direction and will cooperate closely with you.

"In all these matters I know you will execute faithfully the policies of the department, and these will be communicated to you from time to time through the means of correspondence and the columns of the RECLAMATION RECORD. I am sending you herewith issues of the RECORD for August and September, in which you will find some important expressions of such policies, notably Secretary Work's announcement at page 266 and his letter to project managers at pages 268-269.

"It gives me great pleasure to see you enter the forces of the bureau and to have been instrumental in making your appointment. I heartily wish you every success in carrying out your important responsibility."

SECRETARY WORK SEEKS ADVICE OF CONGRESSMEN.

Secretary of the Interior Work has extended an invitation to Senators and Members of the House of Representatives from western States to lay before the Special Advisors now studying reclamation, information on projects in their several States.

In a letter sent to these Congressmen, they were asked to give any information, advice, or suggestions that will aid the Government and the thousands of farmers who must share the burden of maintaining the reclamation projects already established or partially completed. The benefit of their views was especially solicited by the Secretary of the Interior in order that reclamation may be established on a sound basis in the future. The letter follows:

"The condition of Government reclamation has been a matter of concern to me since I have had an opportunity to observe the business methods of the service at first hand.

"National reclamation, as a theory, is sound, and there is a great field for its future; but in order to reconcile the divergence between actual results and the hopes and plans of early advocates of reclamation, a more substantial and economical policy seems to be important if we can hope to reflect credit upon the Government's dealings with reclaimed arid lands and the people who have settled upon them and secure its future successful extension.

"To secure authentic data on the accomplishments of the past twenty-two years, which may be of use in planning for the future, an intensive study is now being made by a body of distinguished men familiar with reclamation problems in the West who have been called together on my invitation.

"I hope to present their findings and recommendations to the President and the Congress in the near future, but in the meantime would appreciate your assistance in unreservedly placing at our disposal, by laying before the committee now studying these problems, any information, advice, or suggestions you may feel will aid the Government and those thousands of farmers and citizens who must share the burden of maintaining the reclamation projects already established or partially completed.

"During the past several months a partial reorganization of the personnel of the Bureau of Reclamation, and the correction of the more obviously improvable methods and procedure followed during recent years, has been accomplished, and the Special Advisors have made considerable progress in their work. These changes, and the scope of the survey, will be published in the forthcoming number of 'THE RECLAMATION RECORD,' which will be sent you immediately upon publication shortly after December 1st. I bespeak your careful consideration of the articles bearing upon the subject which appear therein.

"Much can be accomplished toward establishing reclamation on a sound basis if men in your position familiar with reclamation work and its importance will give the Department the benefit of your views."

COMMISSIONER LOOKS OVER COLUMBIA BASIN

Commissioner David W. Davis, of the Bureau of Reclamation, and Chief Engineer Weymouth, while on their recent inspection trip over a number of the irrigation projects of the bureau, spent some time on the proposed Columbia Basin development, which proposes the reclamation of a large area of land in the south central part of the State of Washington.



Commissioner Davis (right) and Chief Engineer Weymouth on Columbia Basin project.

The accompanying illustration shows the two officials of the bureau viewing the proposed site of the Latah Creek Dam, a few miles south of Spokane, Wash. The photograph was taken by Mr. Roy R. Gill, chairman of the executive committee of the Columbia Basin Irrigation League.

Quack grass can be brought under reasonable control by allowing it to form a sod and then plowing it in midsummer during dry, hot weather. After plowing, the field should be harrowed frequently until winter and the following year planted with a cultivated crop.

The orange growers of the Orland project, California, have organized, elected officers, and articles of incorporation have been approved by the secretary of state of California.



BUSINESS ADMINISTRATION.

THE Honorable Will R. King, on January 15, 1918, while Chief Counsel of the Reclamation Service, wrote to the Civil Service Commission as follows:

"In one respect this (Reclamation) Service is utterly dissimilar from any other in the Federal Government with which I am at all conversant, in this that it is required not only to spend the money appropriated in the construction of irrigation works but to arrange to have the money so spent returned by the water users for whom the works are built. This of necessity makes this service come into contact with a great number of people, most of whom are the water users on the projects, and as these projects are being settled this number is constantly growing and the complications, equal and otherwise, accompanying them increase proportionately.

"The relationship between these water users and the service is more of a 'business' relationship than a governmental relationship. The Government is acting in this regard, as I take it, in a trust capacity for the water users. Under private and corporate enterprises, the people in one valley might make an appropriation of water for their own use, but in this case the Government loans the money to the water users perhaps in an adjoining valley with an understanding that the United States in order to protect its security may be permitted to build the project and retain control until the major portion of the moneys invested are returned, the individual water users ultimately to care for and operate the works, and the Government to retain control of the main reservoirs until such time as Congress may deem it proper to turn the same over to the people benefited by the project constructed.

"This relationship is more analogous to that of a large corporation serving thousands of customers than it is to an ordinary Government bureau. In the early stages of the development of the service this relationship was a very minor matter, and the construction feature was the big thing.

"With the projects largely completed and hundreds of thousands, yes, more than a million, acres under irrigation, this relationship has grown until to-day and hereafter one of the principal things with which this service will have to deal and will have to concern itself is the return of the millions

DAIRY CALVES AND YOUNG STOCK

STRONG, healthy calves are more likely to be dropped by well-nourished cows. The best time to wean the calf is after it has taken the first milk. Early weaning makes it easier to teach the calf to drink.

Everything about the calf should be scrupulously clean.

Milk from infected cows or from a creamery should be pasteurized before it is fed.

Calves should be fed sweet milk of a uniform temperature and should always receive a little less than they desire.

All calves should be fed regularly; very young calves should be fed three times a day.

At first the calf is fed whole milk, the quantity being gradually increased. Skim milk is substituted as soon as practicable and if cheap is continued until the calf is six months old. Ordinarily the maximum quantity of skim milk that can be fed economically is 20 pounds a day. When the calf is two weeks old, grain and bright clean hay should be offered; the quantity fed should be increased as the calf's appetite demands.

Milk substitutes are not equal to milk, but give fair results when used with care.

Quarters must be clean and dry, with plenty of bedding.

Stanchions save milk and prevent the calves from sucking one another.

Horns are more easily prevented than removed.

Water is necessary for calves.

Marks for identification should be plain without disfiguring the animal.

Calf diseases are largely the result of filth and carelessness. Prevention is cheapest and best.

Young dairy stock should have all the hay they will eat, and grain in proportion to weight.

The heifer should be bred to freshen when about two years old. Handling before freshening prevents shyness.

Fall calving usually gives best results.

The young bull should have an abundance of feed, plenty of exercise, and not too heavy service.

The foregoing points on feeding and management of the dairy calf are discussed fully in Farmers' Bulletin No. 1336 of the Department of Agriculture.

of dollars which have been invested in these vast enterprises. * * * This personal and what might be properly termed the 'human' element has so grown as to be one of the principal problems of the service at this time, whereas in the early stages of the service the problems were almost wholly of an engineering nature."

DEPARTMENT OF THE INTERIOR

SECRETARY OF THE INTERIOR
HUBERT H. WALKER

BUREAU OF RECLAMATION
COMMISSIONER
DAVID W. DAVIS

Administration of reclamation work and organization.

FISCAL DEPARTMENT
Traveling inspectors of accounts. 2 employees

ASSISTANT COMMISSIONER

Immediate assistant to the Commissioner and on command substitutes for that official.

CHIEF ENGINEER
J. L. Reynolds

Shall have charge of all engineering work including recommendations, investigations, designs, construction and such other work as may be assigned. 2 employees.

DESIGNING
J. L. Reynolds
Designing Engineer
Design, and construction of all engineering work. 22 employees.

COST & PROPERTY
James Mann
Consulting Engineer
Consulting program regarding program of construction methods. 3 employees.

RESEARCH
J. L. Reynolds
Researching Engineer
Design, and construction of all engineering work. 22 employees.

CONSTRUCTION
A. M. Brooks
Construction Engineer
Occasionally called by Secretary, Commissioner or Chief Engineer for special work. 5 employees.

RECLAMATION PROJECTS
(Investigation and construction of irrigation works.)

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(Investigation and construction of irrigation works.)

PURCHASING
A. M. Brooks
Purchasing Agent
Investigation and purchase of large quantities of supplies, equipment, etc. 10 employees.

RECLAMATION PROJECTS
(Investigation and construction of irrigation works.)

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(Investigation and construction of irrigation works.)

** Number of employees change rapidly as construction work or seasonal operations vary.

Effective Jan. 1, 1924
Approved, Nov. 1, 1923
Secretary of the Interior

Organization chart of the Bureau of Reclamation approved by Secretary of the Interior Work on November 1, 1923; effective January 1, 1924.

INDEX.

RECLAMATION RECORD, VOLUME XIV, FOR THE YEAR 1923.

Page numbers for separate issues.

No.	Month.	Page.	No.	Month.	Page.
1.	January	1-48	7.	July	233-264
2.	February	49-84	8.	August	265-276
3.	March	85-124	9.	September	277-292
4.	April	125-164	10.	October	293-308
5.	May	165-196	11.	November-December	309-332
6.	June	197-232			

A.

	Page.
Abandonment of water in Montana	217
Adams v. Twin Falls-Oakley Land & Water Co.	217
Administrative and statistical progress reports	36, 71, 112, 152, 185, 219, 252
Aerial photographic method of map making	34
Agents, irrigation district not liable for negligence of its	149
Agricultural conference in interest of projects	27
credits act of 1923, the	96
development on reclamation projects, the	
fourth conference on	51
policy for Montrose County, Colo., and the	
Uncompahgre project	137
Agriculture in 1923, prospects for	1
special provisions of the appropriation act	
for the department of	90
Alfalfa, cooperation pays in selling	280
hay, making dollars out of	184
popular with western farmers	271
American Falls Dam—poem	276
suit won by Bureau of Reclamation	329
Anderson-Cottonwood Irrigation District,	
Whiteman v.	149
Apples, one orchard produces 40 carloads of	290
Appropriation act for the Department of Agriculture, special provisions of the	90
for special reclamation investigations	90
of water in Montana	32
Appropriations for Reclamation Service	68
Arrearages in payment of operation and maintenance and construction charges	312
Arrowrock Dam on the Boise project, Idaho, seeing	216
Assessment of city property by irrigation districts	32
Assessments by Oregon irrigation districts	150
in Washington, erroneous irrigation district	250
irrigation district operation and maintenance	250
Automobiles, Yuma project buys many	284

B.

	Page.
Bacon v. Walker	249
Ball, Thomas v.	217, 218
Bathing in canals, stops water pollution from	287
Beaching slopes, Deer Flat Reservoir embankment, Boise project	107
Beet growers given big price for crop	316
Belle Fourche project policy	70
Bien, Morris, George Washington as a surveyor	64
Bills relating to Federal reclamation	33, 70
Bissell, C. A., Beaching slopes, Deer-Flat Reservoir embankment, Boise project	107
Blackfeet project, water rights under	90
Blackley, McConnell v.	218
Blanchard, C. J., Filming the Columbia Basin project	236
Short stories of successful settlers	3, 54, 97, 131, 176
Bleak, Dameron Valley Reservoir & Canal Co. v.	151
Boise project, beaching slopes, Deer Flat Reservoir embankment	107
Boise project crop report, 1922	154
project, economies in canal cleaning	244
project, optimism	147
project, Idaho, seeing Arrowrock Dam on the	216
Bond, Nampa & Meridian Irrigation District v.	250
Booster, be a (poem)	287
Braley, Berton, Salt River project described in verse	147
Burgess, Kinne v.	149
Burley tobacco growing on Huntley project	274
Business administration	331

C.

Cairns, L. G., Drag-line excavator operation, North Platte project, Nebraska-Wyoming	209
Cairns v. Haddock	149
California water storage district act constitutional	217
Camas Division, Flathead (Indian) project, Montana, The	61

	Page.		Page.
Cameron, Smith et al. v.	33	Condemnation for irrigation purposes by individuals.....	32
Cameron, Wheat.....	32	Conference on agricultural development on reclamation projects, the fourth.....	51
Camfield v. United States.....	249	Conservation of water in Idaho.....	149
Camp and mess house, Tieton Dam.....	66	Construction by Oregon irrigation districts, competitive bids for.....	150
Canal cleaning, economies in, Boise project, Idaho.....	244	costs, lower.....	167
Cannon, Miles, appointed as field reclamation commissioner to assist settlers.....	127	reports..... 36, 71, 112, 152, 185, 219,	252
to aid farmers.....	281	Contract interpreted, conditional water.....	149
Development of irrigable area planned for future.....	281	plan proposed for building projects by.....	284
Cantaloupe, growing and marketing hearts of gold.....	299	Cooley, A. C., The fourth conference on agricultural development on reclamation projects.....	51
Carey Act contract, damages under.....	273	Cooperation between Departments of Interior and Agriculture.....	125
Carleton, Rev. Ralph, How one farmer makes things go on the Flathead project, Mont.....	215	pays in selling alfalfa.....	280
Carlsbad project crop report, 1922.....	156	Cooperative marketing in Uncompahgre Valley.....	279
project, Francis G. Tracy, president of the Pecos Water Users' Association, outlines views concerning relief measures.....	108	marketing of eggs is profitable.....	280
project, New Mexico, the.....	143	marketing suggested for Uncompahgre project.....	251
Cash awards given on various farm activities.....	301	Corn crop on Yakima project.....	306
Casteel, Calvin, Okanogan project scores at North Pacific Exposition.....	8	Correspondence, Secretary Work makes pertinent suggestions concerning.....	144
Snow surveys, Okanogan project, Washington.....	248	Costs are coming down.....	148
Changes in diversion and use of water in Montana.....	218	Cotton farmer explains success.....	326
in diversion of water in Colorado.....	218	Cow wins first honors.....	305
Chart, organization, Bureau of Reclamation.....	332	Cows furnish fine income.....	243
Cheese factories on the Minidoka project.....	319	Cox v. Hart.....	250
factories win.....	271	Cream checks big item here.....	319
Cherries make money for Yakima farmers.....	247	Credit.....	296
Chief counsel, Reclamation law notes..... 32, 68, 86, 149, 183, 217, 249, 273, 288, 306, 329	32, 68, 86, 149, 183, 217, 249, 273, 288, 306, 329	Creditors to cooperate; plan your farming and get your.....	130
Engineer Weymouth, acting director.....	136	Crop conditions on the projects..... 282, 307, 327	282, 307, 327
Christie et al. v. Great Northern Ry. Co. et al.....	69	\$6,000,000 from Rio Grande project.....	300
Cippoletti weirs, diagrams for submerged.....	30	prices, September, 1923.....	308
Claims against Government, settlement of.....	33	reports, 1922—	
Cline, L. E., Dairy development of the Newlands project, Nevada.....	199	Belle Fourche project, South Dakota.....	291
Cohen v. Fall, Secretary of the Interior, et al.....	69	Boise project, Idaho.....	154
Columbia Basin, Commissioner Davis looks over.....	331	Carlsbad project, New Mexico.....	156
project, filming the.....	236	Grand Valley project, Colorado.....	72
Commissioner Davis advocates dairying.....	305	King Hill project, Idaho.....	73
Davis declines to serve.....	296	Klamath project, Oregon-California.....	159
Davis inspecting projects.....	290	Lower Yellowstone project, Montana-North Dakota.....	222
of the Bureau of Reclamation, Hon. David W. Davis appointed.....	199	Milk River project, Montana.....	255, 256
Community advertising for Rio Grande project.....	300	Minidoka project, South Side Pumping Division, Idaho.....	188
Competitive bids for construction by Oregon irrigation districts.....	150	project, Gravity Division.....	188
Complaint department.....	270	North Platte project, Interstate Division, Nebraska-Wyoming.....	224
department established.....	277	project, Fort Laramie Division.....	224
Concrete lining of canals and laterals on the Orland project, California, economic advantages of.....	172	Okanogan project, Washington.....	120
		Orland project, California.....	113
		Rio Grande project, New Mexico-Texas.....	157
		Strawberry Valley project, Utah.....	291

INDEX.

III

Crop conditions on the projects—Continued. reports, 1922—Continued.

Sun River project, Fort Shaw Division, Montana.....	116
project, Greenfields and Big Coulee Divisions.....	116
Umatilla project, Oregon.....	258
Williston project, North Dakota.....	41
Yakima project, Sunnyside Division, Washington.....	79
project, Tieton Division.....	80
rotation on irrigated lands, pro and con of.....	297
Crop <i>v.</i> San Joaquin & K. R. Canal & Irrigation Co.....	217
"Culling" of poultry flock is important problem.....	269

D.

Dairy development of the Newlands project, Nevada.....	199
calves and young livestock.....	331
industry pays, the.....	251
Dairying, Commissioner Davis advocates.....	305
on the Minidoka project, Idaho, development of.....	174
Damages under Carey Act contract.....	273
Dameron Valley Reservoir & Canal Co. <i>v.</i> Bleak.....	151
Dams constructed and under construction by the Bureau of Reclamation.....	210
Darlington, Edward B., relation of, to water users.....	330
Daut et al., Selway <i>v.</i>	273
Davis, David W., appointed Commissioner of the Bureau of Reclamation.....	199
biography.....	317
Commissioner of the Bureau of Reclamation.....	197
declines to serve.....	296
inspecting projects.....	290
looks over Columbia Basin.....	331
the Carlsbad project, New Mexico.....	143
the Rio Grande project, New Mexico-Texas.....	168
Day & Hansen Security Co., Lensing <i>v.</i>	273
De Conly <i>v.</i> Winte Creek Canal Co.....	218
Deer Flat Reservoir embankment, Boise project beaching slopes.....	107
Departments of Interior and Agriculture, cooperation between.....	125
Desert-land entries, mortgages on.....	273
Development of irrigable area planned for future.....	281
of the poultry industry, The wonderful.....	283
Dibble, Barry, Development of dairying on the Minidoka project, Idaho.....	174

Director Davis on western trip.....	136
District Court, Eden Irrigation Co. <i>v.</i>	151
Diversion and use of water in Montana, changes in.....	218
of water in Colorado, changes in.....	218
Doan Creek, holdings of Supreme Court of State of Washington relative to water rights are made in case in re waters of.....	273
Drag-line excavator operation, North Platte project, Nebraska-Wyoming.....	209
Drainage on Federal irrigation projects.....	250
on Newlands project.....	90
Dykstra, Prof. R. G., Umatilla future.....	147

E.

Easement for irrigation ditch across another's land.....	149
Economic condition of the landowners.....	91
Economics in canal cleaning, Boise project, Idaho.....	244
of power development, North Platte project, Nebraska-Wyoming.....	169
Eden Irrigation Co. <i>v.</i> District Court.....	151
Efficiency, keynote.....	270
Eggs, cooperative marketing of, is profitable.....	280
more fresh-laid, needed.....	325
Electric development on Minidoka project succeeds.....	267
Elgin <i>v.</i> Weatherstone.....	151
Engdahl et al, Weitensteiner <i>v.</i>	273
Engineering investigations, diagrams for submerged Cippolletti weirs.....	30
Entrymen, proofs by.....	151
Erickson <i>v.</i> Nine Mile Irrigation District.....	32
Esponosa, Nepesta Ditch & Reservoir Co. <i>v.</i>	260
Evans, V. G., Camp and mess house, Tieton Dam.....	66
Expenditures by directors of irrigation districts, limitations on.....	150
Extensions of time of payment, Yakima irrigators oppose wholesale.....	178

F.

Fact-finding commission to investigate system.....	277
Fairs, project, attract attention.....	301
Fall, Albert B., retiring Secretary of the Interior.....	84
Secretary of the Interior, et al., Cohen <i>v.</i>	69
Family, feed the, and sell the surplus.....	286
Farm activities, cash awards given on various.....	301
Farmers' Cooperative Ditch Co., Shelby <i>v.</i>	217
Farmers organize cooperatively.....	280
to aid.....	281
Farming and get your creditors to cooperate, plan your.....	130
Federal instrumentalities, State interference with.....	184
irrigation projects, drainage on.....	250

	Page.		Page.
Federated Association of United States Reclamation Project Water Users, the	60	Holdings of Supreme Court of State of Washington relative to water rights made in case in re waters of Doan Creek (215 Pac. 343)	273
Fernow, Dr. Bernard E., 1851-1923	70	Honor roll	2
Field reclamation commissioner appointed to assist settlers	127	Hubbart Dam site, Flathead project, a natural refrigerator at	218
Filing the Columbia Basin project	236	Huerfano Ditch & Reservoir Co. v. Welton Land & Water Co.	218
Finmand, Pabst v.	149	Hunt, L. A., The Oregon Irrigation Congress and State development	25
Flame thrower to fight grasshoppers	216	Huntley project, burley tobacco growing on	274
Flathead project, a natural refrigerator at Hubbart dam site	218		
project, how one farmer makes things go on the	215	I.	
project, Kenjockety Ranch, Lonepine, Mont.	63	Idle land should be put to work, Secretary Work believes	106
project, the Camas Division	61	Illustration, our front page	251
Fort Laramie Tunnel No. 3, North Platte project, Nebraska	195	Income, cows furnish fine	243
Frank Black Spotted Horse, United States v.	33	Injured Reclamation Service employee, relief for	69
Fraud in acquiring Government land	33	Interests of settlers and Government are one	200
Frost conditions on Mesa Division, Yuma project, Arizona	70	Interior Department dries up a lake	287
		Interstate streams, irrigation rights on	217
G.		Investigation, special advisers begin their	295
Gabel, Glantz v.	150	Investigations, special reclamation	90
Gateway Club's plans, project people back	300	Irrigable area planned for future, development of	281
Gathered from the project press and people	3, 54, 97, 131	Irrigated farms, organic matter essential on	298
Gause v. Pacific Gas & Electric Co.	149	land, some problems of the settler on	12
Gaylord, J. M., Economies of power development, North Platte project, Nebraska-Wyoming	169	land, sugar beets on	151
Gering Irrigation District et al., State ex rel. Clarke et al. v.	150	lands, pro and con of crop rotation on	297
Glantz v. Gabel	150	Irrigation district assessments in Washington, erroneous	250
Government, taking of property by the	250	district, how one works	26
Grand Valley project crop report, 1922	72	district not liable for negligence of its agents	149
Grapefruit growing on the Mesa Division, Yuma project, Arizona	275	district operation and finance	303
Grasshoppers, flame thrower to fight	216	district operation and maintenance assessments	250
Great Northern Ry. Co. et al., Christie et al. v.	69	district warrants in California	218
Grimaud, United States v.	249	ditch across another's land, easement for	149
		ditch on school section	33
H.		easement by prescription in Montana	150
Haddock, Cairns v.	149	easements in Nebraska	217
Hamele, Ottamar, Reclamation law notes	32, 68, 86, 149, 183, 217, 249, 273, 288, 306, 329	problems, President Harding discusses	234
Harding, President—A memory	265	pumping for	202
President, discusses irrigation problems	234	rights on interstate streams	217
Hart, Cox v.	250	Issuance of patent, suit to enjoin	69
Haystacker is a valuable farm adjunct	323		
Hints from practical farmers	7	J.	
Hire of automobile from wife of Government employee	250	Jackson-Walker Coal & Material Co. v. Hodges et al.	33
Hodges et al., Jackson-Walker Coal & Material Co. v.	33	John Day Irrigation District, Northern Pacific Railway Co. v.	150
Hogs, watch your (diseases and ailments)	276	Irrigation District, Northwestern Improvement Co. v.	151
		Jones v. United States	33
		Junk pile, the	123, 163

INDEX.

V



No. 1

K.		Page.			Page.
Kenjockety ranch, Lonepine, Mont.		63	Minidoka project, Gravity Division, crop report, 1922		188
King, Ben. H., Agricultural policy for Montrose, County, Colo., and the Uncompahgre project.		137	project, helping the settler let go		28
King Hill project crop report, 1922		73	project optimism		184
Kinne v. Burgess (Ariz.)		149	project, South Side Pumping Division, crop report, 1922		188
Klamath project crop report, 1922		159	project, succeeds, electric development on		267
project land authorized, suit respecting		89	Mondell, Hon. F. W., National reclamation problems		128
project, Malone diversion dam on, built		285	Montgomery, John, How to make \$1,000 a day		8
L.			Monthly progress reports. 36, 71, 112, 152, 185, 219, 252		
La Porte et al. v. Menacon et al.		33	Montrose County, Colo., and the Uncompahgre project, agricultural policy for		137
Lake Chelan Reclamation District et al., Laycock et al. v.		250	Moody, C. J., The Camas Division, Flathead (Indian) project, Montana		61
Lake, interior Department dries up a		287	Mortgages on desert-land entries		273
Lakes, land bordering on		273	one way to lift farm		251
Land bordering on lakes		273	Mothers, take care of		293
title not necessary to appropriate water in Montana		218	N.		
values		129	Nampa & Meridian Irrigation District v. Bond		250
owners, economic condition of the		91	Natatorium Co., Public Utilities Commission v.		150
Lane et al., United States v.		273	National reclamation problems		128
Lant v. Wolverton		33	Natural refrigerator at Hubbard Dam site, Flathead project, a		218
Laterals by Nebraska irrigation districts, maintenance of		150	Navigable waters in Kansas		33
Law notes		32,	waters in Washington		33
68, 86, 149, 183, 217, 249, 273, 288, 306, 329			Nechanicky, Smith v.		151
Laycock et al. v. Lake Chelan Reclamation District et al.		250	Nepesta Ditch & Reservoir Co. v. Espinosa		250
Lensing v. Day & Hansen Security Co.		273	Newell, F. H., Vacant public lands and their relation to the work of the Reclamation Service		15
Light v. United States		249	Newlands project, another big saving		275
Linfield, F. B., Some problems of the settler on irrigated land		12	project, crop report, 1922		40
Littlepage, Mrs. Louella, Project women and their interests		9,	project, Nevada, dairy development of the		199
57, 103, 139, 179, 211, 239, 271, 285, 302			project, drainage on the		90
Lower Yellowstone project. Construction of the Thomas Point pumping plant		324	project, growing and marketing hearts of gold cantaloupe		299
project crop report, 1922		222	Nine Mile Irrigation District, Erickson v.		32
Lytel, J. L., Sugar beets in the Yakima Valley		14	North Dakota pumping project, Williston Division, preliminary crop report, 1922		41
M.			Northern Pacific Railway Co. v. John Day Irrigation District		150
McClellan, L. N., Pumping for irrigation		202	North Platte project crop report, 1922		224
McClure, Turpey v.		217	project, drag-line excavator operation on the		209
McConnell v. Blackley		218	project, economies of power development		169
McKelvey et al. v. United States		249	project, Fort Laramie Tunnel No. 3		195
Malone diversion dam on Klamath project built		285	project, frost handicaps farmers on the		321
Map making by the aerial photographic method		34	project, Pathfinder reservoir operations		145
Melons grow large in this district		305	North Side Canal Co., Reynolds v.		217
Menacon et al., La Porte et al. v.		33	Northwestern Improvement Co. v. John Day Irrigation District		151
Midway Irrigation Company et al., Snake Mining & Tunnel Company v.		273	Notes from reclamation projects		289, 304
Milk River project crop report, 1922		255, 256	Numbers, H. O., Practical suggestions for poultry farmers		7, 62,
Minidoka farmer, one acre in poultry pays		278	101, 138, 175, 201, 238, 269, 283, 303, 325		
farmer says, "I'm satisfied"		248			
project, cheese factories on the		319			
project, cheese factories win		271			
project, development of dairying on the		174			

O.		P.	
	Page.		Page.
Obstruction of passage over public lands.....	249	Poultry farmers, practical suggestions for.....	7,
Ochoco Irrigation District, Twohy Bros. Co. v.....	150	62, 101, 138, 175, 201, 238, 269, 283, 303, 325	
O'Donnell, I. D., Sugar beets on irrigated land.....	151	flock is important problem, "culling" of.....	269
Okanogan project advance crop report.....	120	for the holiday season.....	303
project scores at North Pacific Fruit Ex-		industry, the wonderful development of	
position.....	8	the.....	283
project, snow surveys.....	248	investment over \$1,000,000,000.....	283
project, waste water from.....	151	pays Minidoka farmer, one acre in.....	278
Oklahoma v. Texas.....	183	raising on our projects.....	63
Omaechevarria v. Idaho.....	249	Power development, North Platte project,	
Operation and maintenance assessments, irriga-		Nebraska-Wyoming, economies of.....	169
tion district.....	250	irrigation districts in Arizona.....	149
and maintenance reports.....	36,	Preis v. Idaho Irrigation Co. (Ltd.).....	273
71, 112, 152, 185, 219, 252		Prescriptive right to water in California.....	149
Optimism on the Minidoka project.....	184	President Harding discusses irrigation problems.....	234
on the Uncompahgre project.....	215	Preston, Porter J., Frost conditions on Mesa	
Orchard, one, produces 40 carloads of apples.....	290	division, Yuma project, Arizona.....	70
Oregon Irrigation Congress and State develop-		Problems of the settler on irrigated land, some.....	12
ment, the.....	25	Produce all you eat.....	95
Organic matter essential on irrigated farms.....	298	Project manager and the water users.....	330
Organization chart, Bureau of Reclamation.....	332	managers, letter from Secretary Work to	
Orland project, a straight-from-the-shoulder		the.....	198
talk.....	2	women and their interests.....	9,
project, economic advantages of concrete		57, 103, 139, 179, 211, 239, 271, 285, 302	
lining of canals and laterals on the.....	172	Projects by contract, plan proposed for build-	
project crop report.....	113	ing.....	284
Otis Orchards Co. v. Otis Orchards Irrigation		Commissioner Davis inspecting.....	290
District No. 1, Wash.....	250	crop conditions on the.....	282, 307, 327
Orchards Irrigation District No. 1 (Wash.),		Proofs by entrymen.....	151
Otis Orchards Co. v.....	250	Property by the Government, taking of.....	250
Outside help, utilize.....	270	Prospects for agriculture in 1923.....	1
P.		Public lands and their relation to the work of the	
Pabst v. Finmand.....	149	Reclamation Service, vacant.....	15
Pacific Gas & Electric Co., Gause v.....	149	lands, rights respecting.....	69
Park-to-park highway map.....	316	Public Utilities Commission v. Natatorium Co.....	150
Parrott v. Twin Falls Salmon River Land &		Pumping for irrigation.....	202
Water Co.....	217	Purebred dairy stock now in good demand.....	305
Parsons, H. F., Participation in benefits of Rec-		R.	
lamation Service storage reservoirs under		Reclamation, Bureau of, tentative policy of the.....	266
Warren Act and other supplemental and		Bureau of, wins in Supreme Court.....	329
amendatory acts.....	110	Bureau of, division of functions of, put into	
Passage over public lands, obstruction of.....	249	effect.....	312
Pathfinder Reservoir operations.....	145	Federal, primarily a farmer's problem.....	316
Payment, extension of time.....	94	mail bag, the.....	26, 108
Peabody v. United States.....	250	notes on.....	311
Percolating water in Idaho.....	150	Project Water Users, the Federated Asso-	
water in Utah.....	273	ciation of United States.....	60
Personnel of Special Advisors Committee.....	295	projects, analysis of.....	314
Pioneer Irrigation Co., Weiland State Engineer,		projects, notes from the.....	289, 328
etc. v.....	217	projects, the fourth conference on agricul-	
Plan proposed for building projects by contract		tural development on.....	51
Policies, Secretary Work outlines general.....	85	Record covers two months.....	823
Portsmouth Harbor Land & Hotel Co. v. United		Service, appropriations for.....	68
States.....	250	Service storage reservoirs under Warren	
Possession of unsurveyed public lands.....	249	Act and other supplemental and amenda-	
Potatoes, business methods for marketing.....	320	tory acts, participation in benefits of.....	110

	Page.		Page.
Reclamation Service, vacant public lands and their relation to the work of the	15	Smith v. Nechanicky	151
Service—What it has done	166	Smokers, take notice	274
the value of	31	Snake Creek Mining & Tunnel Co. v. Midway Irrigation Co. et al.	273
Regulations thereunder, relief act of February 28, 1923, and	86	Snake loses his head but accounts for dog	329
Relief act of February 28, 1923, and regulations thereunder	86	Snow surveys, Okanogan project, Washington	248
for injured Reclamation Service employee	69	Special advisors begin their investigation	295
Reorganization of Washington office saves thousands	311	advisors outline scope of investigation	313
Reservoirs, monthly condition of principal Reclamation Service	36,	Sproat et al., Swan et al. v	33
71, 112, 152, 185, 219, 252, 275, 292,	308	Spud growers on the Shoshone project	327
status of water flowing through	250	the late	320
Resolutions adopted by directors of west extension irrigation district, Umatilla project	102	State ex rel. Clarke et al v. Gering Irrigation District et al.	150
Results of irrigation, 1922, Umatilla project, Oregon	123	interference with Federal instrumentalities	184
Reynolds v. North Side Canal Co.	217	Statistician, C. J. Blanchard, Short stories of successful settlers	3, 54, 97, 131, 176
Rights respecting public lands	69	Steward, W. G., Diagrams for submerged Cippiletti weirs	30
Rio Grande claims before a tribunal	296	Stock, feed wheat to, when prices are low	290
project, community advertising for	300	Storage reservoirs under Warren Act and other supplemental and amendatory acts, participation in benefits of Reclamation Service	110
project crop report, 1922	157	Straight-from-the-shoulder talk, a	2
project, New Mexico-Texas, the	168	Stump land reclaimed in Oregon	111
project, \$6,000,000 crop from	300	Sturm, George W., A straight-from-the-shoulder talk	2
Riparian rights in State of Washington	151	Success depends on careful planning	298
Risk should be reduced, element of	297	Successful settlers, short stories of	3, 54, 97, 131, 176
Riverton project, cloudbursts	276	Sugar beets in the Yakima Valley	14
S.		beets on irrigated land	151
Sale of interest in unsurveyed public land	218	Suit respecting Klamath project land authorized to enjoin issuance of land patent	89
Salt River project described in verse	147	Sun River project (Fort Shaw Division), advance crop report	116
San Joaquin & K. R. Canal and Irrigation Co., Crow v	217	project (Greenfields and Big Coulee Divisions), advance crop report	116
Saved—\$45,000	270	Sunnyside Valley irrigation district, Yakima project, paid to Government final payment of all charges accruing for construction and operation and maintenance during calendar year 1922	273
Saving, another big	275	Surplus, feed the family and sell the	286
Schlect, Yuma County Water Users' Assn. v	183	Swan et al. v. Sproat et al	33
Secretary Work outlines general policies	85	System, fact-finding commission to investigate	277
Work seeks advice of Congressmen	330	T.	
Selway v. Daut et al	273	Tarpey v. McCluse	217
Service orders, recent	29, 70, 122	Tentative policy of the Reclamation Bureau	266
relations	268	Texas, Oklahoma v	183
render a full measure of	144	Thomas Point pumping plant, construction of the	324
Ser-Vis v. Victor Irrigation District et al	218	Thomas v. Ball	217, 218
Settler let go, helping the	28	Tieton Dam, camp and mess house	66
Settlers, field reclamation commissioner appointed to assist	127	Time of payment, extension of	94
Shelby v. Farmers' Cooperative Ditch Co.	217	Title to land, when Government parts with	33
Shore of navigable lake defined	33	Tracy, Francis G., president of the Pecos Water Users' Association, Carlsbad project, outline views concerning relief measures	108
Short stories of successful settlers	3, 54, 97, 176	Tucker, C. L., Economics in canal cleaning, Boise project, Idaho	244
Shoshone project, Garland Division, advance crop report, 1922	44	Tule Lake, Interior Department dries	287
project, Frannie division, advance crop report, 1922	44		
project, spud growers	327		
Smith et al. v. Cameron	33		
Smith, Hon Addison T., Economic condition of the landowners	91		

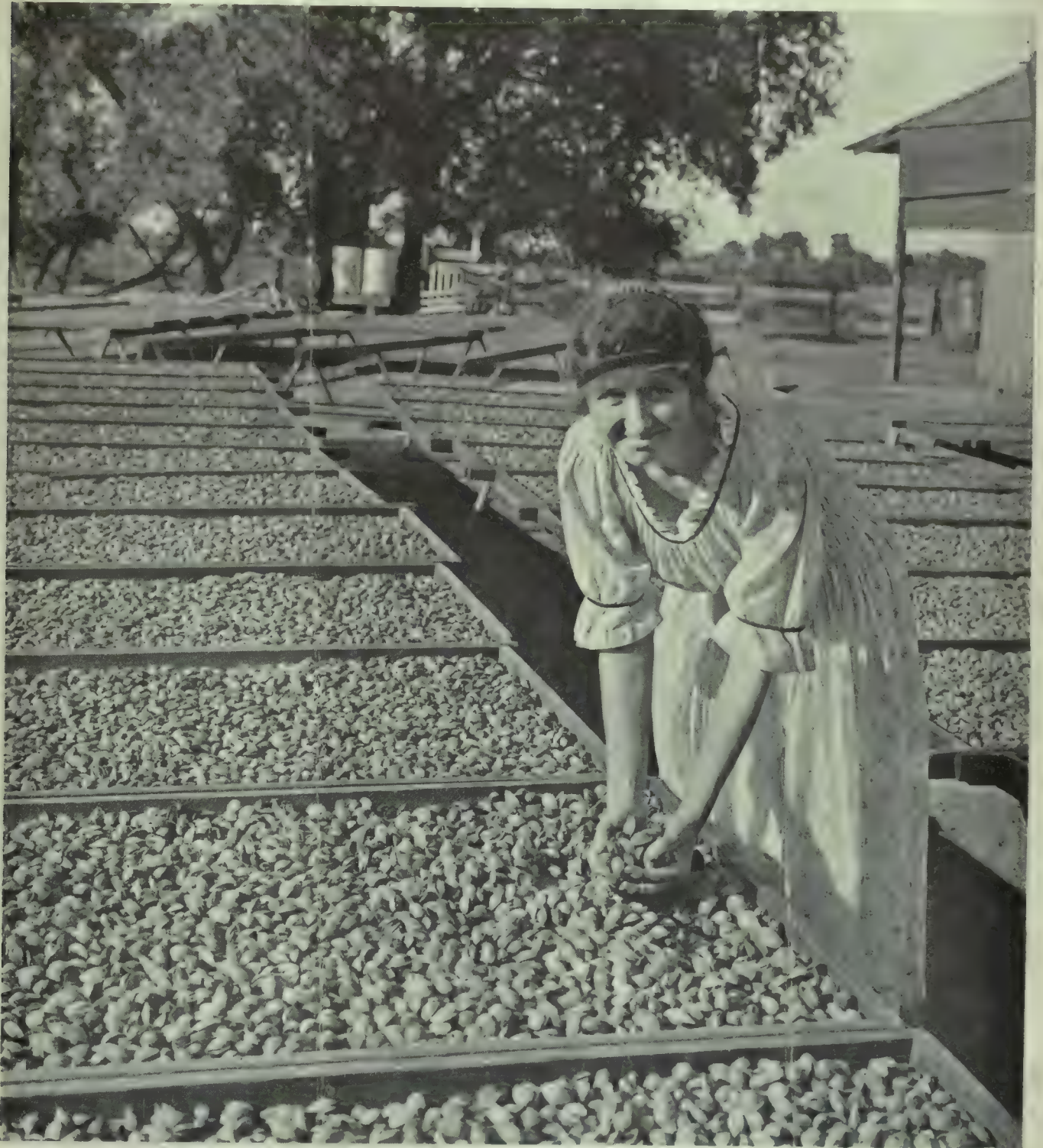
	Page.		Page.
Twin Falls-Oakley Land and Water Co., Adams v.....	217	Water rights, adjudication of.....	33
Salmon River Land & Water Co., Parrott v.....	217	rights to land, relation of.....	273
Twohy Bros. Co. v. Ochoeco Irrigation District.....	150	rights under Blackfeet project.....	90
U.		Weatherstone, Elgin v.....	151
Umatilla project, cash awards given on various farm activities.....	301	Weber, R. C. E., Economic advantages of concrete lining of canals and laterals on the Orland project, Calif.....	172
project crop report, 1922.....	258	Weiland, State Engineer, etc., v. Pioneer Irrigation Co.....	217
project, resolution adopted by directors of west extension irrigation district.....	102	Weiss, Andrew, Pathfinder Reservoir operations.....	145
project, results of irrigation, 1922.....	123	Weitensteiner v. Engdahl et al.....	273
Umatilla's future.....	147	Welton Land & Water Co., Huerfano Ditch & Reservoir Co. v.....	218
Uncompahgre project, agricultural policy for Montrose County, Colo., and the.....	137	Western farmers, alfalfa popular with.....	271
project, cooperative marketing suggested for.....	251	Weymouth, chief engineer, acting director.....	136
project, optimism on the.....	215	What have you done.....	166
Valley, cooperative marketing in.....	279	Wheat v. Cameron.....	32
United States, Camfield v.....	249	Whiteman v. Anderson-Cottonwood Irrigation District.....	149
United States, Jones v.....	33	Winter Creek Canal Co., De Conly v.....	218
United States, Light v.....	249	Wishard, A. L., How one irrigation district works.....	26
United States, McKelvey et al. v.....	249	Wolverton, Lant v.....	33
United States, Peabody v.....	250	Work, Hubert, Cooperation between Departments of the Interior and Agriculture.....	125
United States, Portsmouth Harbor Land & Hotel Co. v.....	250	incoming Secretary of the Interior.....	50
United States, Utah Power & Light Co. v.....	249	take care of mothers.....	293
United States v. Frank Black Spotted Horse.....	33	tentative policy of the Reclamation Bureau to the farmers on the reclamation projects and the employees of the service.....	85
United States v. Grimaud.....	249	Secretary, believes idle land should be put to work.....	106
United States v. Lane et al.....	273	Secretary, fact-finding commission to investigate system.....	277
Unsurveyed public land, sale of interest in.....	218	Secretary, makes pertinent suggestions concerning correspondence.....	144
public lands, possession of.....	249	Secretary, outlines general policies.....	85
Utah Power & Light Co. v. United States.....	249	Secretary, render a full measure of service.....	144
Utah water rights act constitutional.....	151	Secretary, to the project managers, letter from.....	198
V.		Y.	
Values, land.....	129	Yakima farmers, cherries make money for.....	247
Victor irrigation district et al., Ser-Vis v.....	218	irrigators oppose wholesale extensions of time of payment.....	178
Vision.....	309	project, annual meeting of ditch riders and water masters.....	184
Von Segen, W. W., Kenjockety ranch, Lonepine, Mont.....	63	project, corn crop on.....	306
W.		project, sugar beets in the Yakima Valley.....	14
Walker, Bacon v.....	249	project, Sunnyside Division, crop report, 1922.....	79
Wallace, Secretary, sends letter of appreciation.....	182	project, Tieton Division, crop report, 1922.....	80
Secretary, The agricultural credits act of 1923.....	96	Yuma County Water Users' Association v. Schlect.....	183
Washington, George, as a surveyor.....	64	project buys many automobiles.....	284
Washington office reorganization saves thousands.....	311	project, frost conditions on Mesa Division.....	70
Waste water from Okanogan project.....	151	project, Mesa Division, grapefruit growing on.....	275
Water charges in Idaho under State law, payment of.....	217		
economy.....	316		
evils of waste of, and how to lessen them.....	322		
flowing through reservoirs, status of.....	250		
in California, prescriptive right to.....	149		
in Idaho, conservation of.....	149		
in Montana, abandonment of.....	217		
in Utah, rotation in use of.....	151		
pollution by bathing in canals, stops.....	287		

The Reclamation Record

Vol. 15

JANUARY, 1924

No. 1



DRYING ALMONDS ON THE ORLAND PROJECT, CALIFORNIA.

RESOLUTIONS



The New Year sees the dawn of a New Era in Reclamation

It will aim to serve and not disserve.

It will bring the farmer into the picture.

*It will appraise the human element first and
mechanics afterward.*

*It will subordinate the service to the farmer and not the
farmer to the service.*

*It will operate from the farm on the project to the reclamation bureau,
and from the bureau to the farm.*

*It will recognize that the hard work necessary to success in farming should be
rewarded by proper administration in Washington and elsewhere.*

*It will establish relations between estimates and costs, between demands
made and service rendered, and propose an equitable
adjustment of reclamation problems.*

*It will endeavor to reclaim the farm home from discouragement,
as well as the soil of the desert, so that home-environment
may develop contented people along with
bumper crops.*

To the end that Reclamation may mean—

To the Engineer—Accomplishment.

To the Farmer—Service.

To the Family—Abundance.

To the Community—Prosperity.

To the Nation—Wealth.



A NEW VISION FOR 1924

THE employees of Reclamation are asked to study their service from a new viewpoint and, if possible, to fit themselves into it. Reclamation has been discredited. By whom or why is unimportant now, but the Service is its own advertisement and speaks for itself. A new future for it is being worked out by able men, with painstaking care and results are the first concern.

Whether reclamation shall continue; prove to be a beneficence and a tribute to Government operation of public works, will be determined by the spirit and capacity of those responsible for its direction and the attitude of the employees under them.

No one should deceive himself by thinking he is necessary to any position. There is no such thing as the "best man" or the "only man" for any position. His importance is only relative.

The Reclamation Service will try to discover those who wish to remain with it, by appraising their attitude toward it. With a spirit of service demonstrated by disloyalty to the job, any employee of the Government becomes surplus and will be so regarded.

The future of reclamation has never been so acute in its history as now. With a practical, reasonable scheme of operation; with the primary purpose of developing new country and finding permanent homes for people, instead of construction at any cost with final payment in doubt, the greatest step in the history of reclamation has been taken.

"GET OUT OR GET IN LINE."

By ELBERT HUBBARD.

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IF ALL the letters, messages, and speeches of Lincoln were destroyed, except that one letter to Hooker, we should still have a good index to the heart of the Rail-Splitter.

In this letter we see that Lincoln ruled his own spirit; and we also behold the fact that he could rule others. The letter shows frankness, kindliness, wit, tact, wise diplomacy, and infinite patience. Hooker had harshly and unjustly criticized Lincoln, his Commander in Chief, and he had embarrassed Burnside, his ranking officer. But Lincoln waives all this in deference to the virtues that he believes Hooker possesses, and promotes him to succeed Burnside. In other words, the man who had been wronged promotes the man who had wronged him over the head of a man whom the promotee had wronged and for whom the promoter had a warm, personal friendship. But all personal considerations were sunk in view of the end desired. Yet it was necessary that the man promoted should know the truth and Lincoln told it to him in a way that did not humiliate nor fire to foolish anger, but which certainly prevented the attack of cerebral elephantiasis to which Hooker was liable.

Perhaps we had better give the letter entire, and so here it is:

EXECUTIVE MANSION,
Washington, January 26, 1863.

Major-General HOOKER:

GENERAL: I have placed you at the head of the Army of the Potomac. Of course I have done this upon what appear to me to be sufficient reasons, and yet I think it best for you to know that there are some things in regard to which I am not quite satisfied with you.

I believe you to be a brave and skillful soldier, which, of course, I like. I also believe you do not mix politics with your profession, in which you are right.

You have confidence in yourself, which is a valuable if not an indispensable quality.

You are ambitious, which, within reasonable bounds, does good rather than harm; but I think that during General Burnside's command of the Army you have taken counsel of your ambition and thwarted him as much as you could, in which you did a great wrong to the country and to a most meritorious and honorable brother officer.

I have heard, in such a way as to believe it, of your recently saying that the Army and the Government needed a dictator. Of course it was not for this, but in spite of it, that I have given you the command. Only those generals who gain successes can set up dictators. What I now ask of you is military success, and I will risk the dictatorship. The Government will support you to the utmost of its ability, which is neither more nor less than it has done and will do for all commanders. I much fear that the spirit you have aided to infuse into the Army, of criticizing their commander and

withholding confidence from him, will now turn upon you. I shall assist you as far as I can to put it down. Neither you nor Napoleon, if he were alive again, could get any good out of an army while such a spirit prevails in it. And now beware of rashness; beware of rashness, but with energy and sleepless vigilance go forward and give us victories.

Yours very truly,

A. LINCOLN.

One point in this letter is especially worth our consideration, for it suggests a condition that springs like a deadly nightshade from a poisonous soil. I refer to the habit of sneering, carping, grumbling at and criticizing those who are above us. The man who is anybody and who does anything is surely going to be criticized, vilified, and misunderstood. This is a part of the penalty for greatness, and every man understands it; and understands, too, that it is no proof of greatness. The final proof of greatness lies in being able to endure contumely without resentment. Lincoln did not resent criticism; he knew that every life must be its own excuse for being, but look how he calls Hooker's attention to the fact that the dissension Hooker has sown is going to return and plague him: "Neither you, nor Napoleon, were he alive, could get any good out of an army while such a spirit prevails in it." Hooker's fault falls on Hooker—others suffer, but Hooker suffers most of all.

Not long ago I met a Yale student home on a vacation. I am sure he did not represent the true Yale spirit, for he was full of criticism and bitterness toward the institution. President Hadley came in for his share, and I was supplied items, facts, data, with times and places, for a "peach of a roast."

Very soon I saw the trouble was not with Yale; the trouble was with the young man. He had mentally dwelt on some trivial slights until he had got so out of harmony with the institution that he had lost the power to derive any benefit from it. Yale is not a perfect institution—a fact, I suppose, that President Hadley and most Yale men are quite willing to admit; but Yale does supply certain advantages, and it depends upon the students whether they will avail themselves of these advantages or not.

If you are a student in a college, seize upon the good that is there. You get good by giving it. You gain

by giving—so give sympathy and cheerful loyalty to the institution. Be proud of it. Stand by your teachers—they are doing the best they can. If the place is faulty, make it a better place by an example of cheerfully doing your work every day the best you can. Mind your own business.

If the concern where you are employed is all wrong, and the Old Man a curmudgeon, it may be well for you to go to the Old Man and confidentially, quietly, and kindly tell him that he is a curmudgeon. Explain to him that his policy is absurd and preposterous. Then show him how to reform his ways, and you might offer to take charge of the concern and cleanse it of its secret faults. Do this, or if for any reason you should prefer not, then take your choice of these: Get Out, or Get in Line. You have got to be one or the other—now make your choice.

If you work for a man, in Heaven's name work for him.

If he pays you wages that supply you your bread and butter, work for him—speak well of him, think well of him, stand by him, and stand by the institution he represents.

I think if I worked for a man I would work for him. I would not work for him part of the time and the rest of the time work against him. I would give an undivided service or none. If put to the pinch, an ounce of loyalty is worth a pound of cleverness. If you must vilify, condemn, and eternally disparage, why, resign your position, and when you are outside, damn to your heart's content. But, I pray you, so long as you are a part of an institution, do not condemn it. Not that you will injure the institution—not that—but when you disparage the concern of which you are a part, you disparage yourself.

More than that, you are loosening the tendrils that hold you to the institution, and with the first high wind that comes along, you will be uprooted and blown away in the blizzard's tract—and probably you will never know why. The letter only says, "Times are dull, and we regret there is not enough work," etc.

Everywhere you find those out-of-a-job fellows. Talk with them and you will find that they are full of railing, bitterness, and condemnation. That was the trouble—through a spirit of

(Continued on page 5.)

THE RECLAMATION RECORD

Issued monthly by the Department of the Interior, Bureau of Reclamation, Washington, D. C.

HUBERT WORK
Secretary of the Interior

DAVID W. DAVIS
Commissioner, Bureau of Reclamation

Vol. 15

JANUARY, 1924

No. 1

SPECIAL ADVISORS CONTINUE RECLAMATION ANALYSIS.

Senators and Congressmen from western States at invitation of Secretary of the Interior give information to committee on local project conditions—Final report expected in February.

THE task of reclaiming reclamation is being vigorously prosecuted by the Committee of Special Advisors appointed by Secretary of the Interior Work.

During the past month hundreds of petitions and complaints have been received from water users on practically every one of the 24 projects now in operation. All of these have received the attention of the members of the committee. In addition almost one hundred persons have appeared personally before the Special Advisors and presented information upon every phase of reclamation. These witnesses included officials of the Bureau of Reclamation and the Department of the Interior, soil and agricultural experts from the Department of Agriculture, four governors of western States, geologists, engineers, expert auditors, settlers and farmers from reclamation projects, and dozens of other persons interested in and having knowledge of the irrigation methods and policies of the Government.

One of the most interesting needs of the development of the work so far developed by the committee is that there seems to be a consensus of opinion on the part of those who have appeared before the committee that, although there are serious problems confronting the reclamation projects, problems that must be solved before the projects can really be said to be successful, yet there is, on the part of all who understand the situation, a definite conviction that irrigation as such is the key to the development of the great semi-arid part of the United States. The disposition on the part of all classes of people interested in the projects to assist, literally, and without prejudice to give assistance in the work of the committee of discovering the real facts connected with the problems of the Federal irrigation projects, is most commendable and has been a steady source of encouragement to the committee.

Necessarily a very large body of facts and figures must be examined, sifted, and

organized to arrive at conclusions that would be of real value to the water users; but once this work is done, it undoubtedly will bring into clear view the simple principles that must be recognized in the development of irrigation in this country under modern conditions.

ANNOUNCEMENT

CHAIRMAN Thomas E. Campbell, of the Special Advisors on Reclamation, has announced that members of the committee will make a visit to a number of the projects for the purpose of gaining first-hand information regarding them.

This decision was reached after many petitions had been received from water-users on projects asking that the Special Advisors make personal investigations on the local financial and economic conditions.

It has not yet been determined by the committee what projects nor the number that will be visited.

A visit from Vice President Gillman, of the Great Northern Railway, with respect to the Milk River project is only an indication of the interest that the railroads are taking in the development of the projects. Such interests are doing their utmost to provide relief for the farmers by securing proper financial credits, arranging freight rates, securing markets, and in such other ways as may be legitimately done by such organizations.

Among the very interesting documents brought to light by the Special Advisors is one written to the Reclamation Service by Sir William Wilcox, the noted British irrigation authority, in 1914, discussing the paramount need of a careful advised use of water at the disposition of the farmers, both to cut down the cost of irrigation water, to increase the crops, and to prevent seepage.

As a result of a special invitation from the Secretary of the Interior many Senators and Members of the House of Representatives have advised the Special Advisors with regard to the existing conditions, both financial and economic, of the projects in their respective States and districts.

Following out the program of the committee for securing reliable information on soil, climate, seepage, drainage, number of farms, settlers, crops, marketing, engineering features, and other irrigation questions, elaborate reports are being submitted by project managers.

Although no definite time has been fixed when the Special Advisory Committee will announce its findings with recommendations containing a definite policy to be followed in conducting Government reclamation in the future, it is expected that its final report will be completed around the first or the middle of February. This report will be submitted to the Secretary of the Interior, who will transmit it to the President and to Congress.

The members of the Special Advisors on Reclamation include former Gov. Thomas E. Campbell of Arizona, chairman; Dr. John A. Widtsoe of Utah, secretary; former Secretary of the Interior James R. Garfield of Ohio; Hon. Elwood Mead of California; President Oscar E. Bradfute, of the American Farm Bureau Federation of Ohio; President Julius H. Barnes of the United States Chamber of Commerce, and Hon. Clyde C. Dawson, of Colorado. The committee is holding sessions in room 6106, Interior Department Building, At Washington.

Farming is a business, just as is the manufacture of automobiles or any other industrial activity. The successful farmer must be a good manager, and the better his management the greater his success.

HOMES OF FARM MOTHERS A STUDY OF WIDE IMPORTANCE.

"There is no exhausting monotonous drudgery known to civilization comparable to that the average farmer's wife endures—Electricity and modern household appliances pointed out as solution."

WHEN land grant colleges were legislated into existence it was thought logical to exchange land for schools that would teach the science of the land. The secrets of the earth still lie largely hidden and the relations existing between the soil, the sun, the rain, and the air, have not yet been fully determined although well under way.

At that time farming was regarded only as a mode of living. If a farm would support the family and school the children it was believed to have served its purpose. In later years with improved machinery and expanded markets through enlarged transportation outlets, farming on a larger scale became possible and was often regarded as a speculative or commercial enterprise. The mode of living changed. Enlarging business increased the personnel of the home, multiplying its labors, without increasing home labor-saving devices. Farm mothers broke under it. The casualties of this system have been many times greater than our casualties in the World War.

The standard of living for farm women must be adapted to their physical strength and mental needs, at least up to that of right-living town dwellers. This is fundamental and goes to the root of future social economics of this country. It is an essential to striking a balance between city and urban population, for the farm mother encourages her sons and daughters to take schooling so that they may be independent of farm life as she has known it.

With your study of the soils must come a study of its best crop—the children it grows and the mothers who produce them.

The mother is the essential of any home. It should be to her conservation and inspiration on the farms that clubs, schools, and Government agencies should address themselves. She is the foundation of all generations of men.

My recollection of the farm mothers I grew up among recalls them as always tired, and moreover many of them were stepmothers. There is no exhausting monotonous drudgery known to civilization that is comparable to that the average farmer's wife endures. The insatiable appetite of growing children and working men; the wearing and soiling of clothing, the hourly repetition of that done yesterday, the bearing and rearing of children, all done under pressure of maternal anxiety, and stimulated by self-respect.

The farm mother's home and her relation to it and through it her influence on those who will govern the future should be recognized as a national study of

pressing importance. Service relations do and will direct the policies of civilized governments. It colors the history of peoples. A great Civil War was fought on these issues two generations ago. Strikes were fomented by them, and happiness in the home is dependent upon their application. The service relations of the farm home mother likewise must be readjusted.

A PROMISE

THE old year is a tale that is told, but each New Year is a promise. Every change or event carries its promise.

Many readers of the RECLAMATION RECORD have been living with hope abandoned, others with expectations deferred, but it is not too much to assure them that a new era of promise is here that gives assurance of being substantial and not conjectural.

The first intelligent, comprehensive study of reclamation in its history which included the farmer, has been under way for months.

It is expected that soil productivity, length of seasons, and construction costs will be investigated; marketing and colonization studied; irrigated, irrigable, and unirrigable acreage computed, and theories exploded and facts established.

It is believed that costly experimental engineering has had its day and that "promoting" of reclamation, primarily in the interests of construction, will give way to that which will be practicable and profitable in operation, so that reclamation may be featured for the Reclamationist who, in the final analysis, is the man who reclaims the soil and for whom it was intended.

In the early formative history of women's clubs having sociologic intent they were offensively referred to as organizations of old maids and childless wives, without purpose. No definition could be more unjust.

It is the unmarried sister who is the ministering angel to a widowed sister, to the brother's orphaned children, or to the aged parents. It is she who visits the brother in prison or the sister hopelessly insane, after all other relatives abandon them. The childless wife or the mother whose family is reared and gone from her, do not court idleness in these blessed days, but with added years and ripened experience, prompted by the grandest human instinct, gives of herself to the world and its betterment.

No one, unless in public life, can estimate the willingness of people to help others, particularly in a large way, and no

one can appraise the value of these services. Whether or not we indorsed equal suffrage, it did give to women the assurance of organization, and their sense of justice and their attitude toward moral questions is always wholesome.

All of these observations are intended to suggest steps that should lead toward the farm home as the point of beginning in a movement for a high type of governing citizenship. One of the most advanced movements of this time is the campaign to introduce motor-driven labor-saving machinery into the farm home for the relief of the woman there. Originating as an economic conception I will admit, just as prohibition did, the resulting conservation of women will also have a direct human reflection on race improvement.

Out of it should come the reading mother; the home teaching of children; a more hygienic environment; a better physical; a stronger mentality; a higher responsible moral sense, and finally the Nation's greatest present need—contentment of mind and time for reflection.

It is time those people who live in cities should realize that the motor has merged each town into the next one; that farmers all live in the suburbs with only acres between instead of streets; that their vision of public affairs is clearer because not confused with passing incidents of city life.

The modern American home is not found in the cities. It must be cultivated and fostered in the country, for from it must continue to come the men who will do the thinking for this great Nation.

It would not be possible for you instructors to differentiate between the value to the student of that part of the year spent at home and that spent in school. Both are essential to a rounded education. All teachers know the influence of the home atmosphere. If our social fabric is to be renewed the necessary coloring must be done in the home and that, too, in the farm homes of the United States, where there are 7,700,000 children under 10 years of age.

I would make a plea for the farm family unit; for these six millions of women on farms:

That their load might be lightened;
Their hours shortened;
Recreation enjoyed and their minds rested;

That they be helped to take their place as character builders;

To build the home life around them.
Speech in part by Secretary of the Interior Work to Association of Land-Grant Colleges.

PICTORIAL LESSONS IN PRACTICAL IRRIGATION.

LESSON No. 1



The border method of irrigation.

NOTE.—Beginning in this issue of the *RECLAMATION RECORD* will appear a series of lessons in practical irrigation accompanied by a photographic illustration showing mistakes frequently made by farmers in placing water upon their lands.

Note that the field shown in the above picture is divided by low flat ridges into somewhat narrow strips. This is done to confine the water, so that it may be

more easily controlled by the irrigator. The border method of irrigation is simply a variation of the flooding method. The ridges which make irrigation somewhat easier, obstruct cultural operations. In the picture, a very large head of water is used to hasten the process of irrigation. Unless the land is very carefully leveled, a smaller head of water is usually preferable. One disadvantage of this

method of irrigation is the relatively large run-off at the lower end of the field, unless the land is very level. Clayey soils, when drying, tend to "check" badly. For that reason furrow irrigation is preferable on such soils. Early cultivation after irrigation, which is always desirable, is imperative on heavy soils with a "checking" tendency. Note the excellent concrete ditch in the above picture.

GET OUT OR GET IN LINE.

(Continued from page 2.)

fault finding they got themselves swung around so they blocked the channel, and had to be dynamited. They were out of harmony with the concern, and no longer being a help they had to be removed. Every employer is constantly looking for people who can help him; naturally he is on the lookout among his employees for those who do not help, and everything and everybody that is a hindrance has to go. This is the law of trade—do not find fault with it; it is founded on nature. The reward is only for the man that helps, and in order to help you must have sympathy.

You can not help the Old Man so long as you are explaining in undertone and whisper, by gesture and suggestion, by thought and mental attitude, that he is a curmudgeon, and his system dead wrong. You are not necessarily menacing him by stirring up discontent and warming envy into strife, but you are doing this: You are getting yourself upon a well-greased chute that will give you a quick ride down and out. When you say to other employees that the Old Man is a curmudgeon you reveal the fact that you are one; and when you tell that the policy of the institution is "rotten," you surely show that yours is.

Hooker got his promotion even in spite of his failings, but the chances are that your

employer does not have the love that Lincoln had—the love that suffereth long and is kind. But even Lincoln could not protect Hooker forever. Hooker failed to do the work, and Lincoln had to try some one else. So there came a time when Hooker was superseded by a Silent Man, who criticized no one, railed at nobody—not even the enemy. And this silent man, who ruled his own spirit, took the cities. He minded his own business, and did the work that no man ever can do unless he gives absolute loyalty, perfect confidence, and untiring devotion. Let us mind our own business and work for self by working for the good of all.

THE CORRUGATION METHOD OF IRRIGATION.

This method of irrigation is well adapted for the efficient application of water to steep or irregular slopes, or where the farmer is required to use a small stream of water, or for new land which has not yet been thoroughly prepared for irrigation.

THE corrugation method of irrigation is a modification of the older and more widely known furrow method.

The principle involved in the corrugation method is that of subirrigation accomplished by allowing small streams of water to flow through a series of narrow, shallow furrows or corrugations long enough to permit the horizontal seepage from adjacent irrigated corrugations to meet, thus resulting in a thorough wetting of the soil between the corrugations, as described in Farmers' Bulletin 1348, Department of Agriculture.

Corrugations are essentially small furrows spaced from 16 to 48 inches apart depending on the soil type. When carrying the proper stream of water, they are supposed to irrigate the soil thoroughly, principally by a capillary movement of the moisture. Theoretically the stream used in the corrugations is just enough to supply water for uniform absorption on all sides of the corrugation and throughout its length to a depth not greater than the lowest plant rootlets without any waste at the lower end. The length of corrugations and the distance between them should be such as to accomplish this result. Usually the best practice to follow in making corrugations is to have them neither deeper nor wider than is necessary safely to confine the stream.

Shallow furrows are most effectual in spreading the moisture horizontally at the ground surface. In the irrigation of trees and deep-rooted crops, such as alfalfa, the farmer not infrequently uses deep corrugations with the idea of wetting the subsurface rather than the surface soils, but allows the water to run until moisture shows on the surface. This usually will require a much longer time of application than should be necessary to properly irrigate the crop and will result in a waste of water through deep percolation. Under ordinary conditions corrugations 4 inches deep and 5 or 6 inches wide will be most satisfactory.

The proper distance between corrugations for a particular soil is double the horizontal distance through which moisture will move away from the water line during the time required for the downward moving moisture to reach the maximum depth of plant rootlets. For example, the feeding rootlets of an alfalfa plant extend an average depth of 6 feet into the ground. If the vertical movement of moisture downward is six times

as rapid as the horizontal movement then soil will be moistened for a distance of 1 foot on each side of a corrugation during the time required for wetting the soil to the proper depth. In this case corrugations should be spaced at intervals of 2 feet. Lava ash soils have almost the characteristics of blotting paper, so rapid is the horizontal movement of moisture and so far does the movement extend. In very heavy soils this horizontal seepage is so slow as to render the use of corrugations ineffective as a means of irrigation.

AGRICULTURE BASIS OF EACH COMMONWEALTH

There has been no permanent development and use of any of the natural resources lavished upon the West, except as surrounding communities of men and women have been firmly established. Without people on farms and in towns and cities there would be little mining, manufacturing, and other similar enterprises. Power has value only as human beings, living in community environment, may use it. Since the foundation of any commonwealth is agriculture, it follows that in arid and semiarid countries, irrigation is the first compelling practice, which once properly established, will lead to the development of all other resources.

—Dr. John A. Widtsoe, Member and Secretary, Committee of Special Advisors on Reclamation.

In sandy soil the downward movement of moisture is so much greater than the horizontal movement that the loss of water through deep percolation prohibits this method. The presence of hardpan or some other stratum which will halt the downward movement of water is a favorable condition for widely spaced corrugations. In general practice the interval between corrugations varies from 16 inches to 3 or 4 feet with the most usual spacing about 20 inches.

In determining the spacing, the irrigator often allows labor and expense to have greater weight than the requirements of the soil. The result is that wide intervals between furrows and slow rates of irrigation are used with consequent overirrigation and a probable development of need for drainage. The simple

experiment of running water for different lengths of time through separate corrugations and then excavating a trench across them, exposing the area of dampened soil, will aid the irrigator in determining the proper spacing of corrugations and the length of time that water should be allowed to remain in them for any given soil condition. Since the watering, cultivation, and growth of crops very frequently bring about a change in the physical properties of a soil and subsoil, it is advisable to redetermine the proper spacing of corrugations and the proper rate of irrigation after land has been farmed for five or six years.

The length of corrugations varies from 150 to 1,200 feet, but more often they are from 300 to 600 feet. Generally the longer the corrugation, the more inefficient it is in uniformly distributing irrigation water throughout its length, and consequently it should always be as short as practicable. Under ordinary conditions 300 to 400 feet represents good practice, but shorter corrugations are needed for either very steep or comparatively level lands, and it may be advantageous to use longer furrows for soil which absorbs water slowly. On very steep slopes an exceedingly small stream is used in order to reduce soil erosion to the minimum, and this stream will not travel very far before being absorbed. Under such conditions the length of corrugations is limited to 200 feet or less. Likewise for comparatively level land fields must be short to confine streams to the small furrows and water the land in a reasonable time.

Slopes giving the least difficulty in the operation of the corrugation method are from 1 to 2 feet per 100 feet, but slopes as great as 15 to 20 feet per 100 feet may be irrigated properly by this method. In fact the greatest advantage of the corrugation method is its adaptability to steep, rough land. For comparatively flat land some method of flooding is much to be preferred, but whatever the grade, it is advisable to run the water in the direction of maximum slope, since any appreciable side slope is likely to cause the breaking over of one stream to the next. A field may be terraced to take up the side slope and so provide a more moderate grade, but the expense of terracing, the waste of land, the difficulty of keeping the steep slopes between terraces free from weeds, and the added difficulty of harvesting crops make the use of the original slope preferable.

LARGEST CHECK RECEIVED BY RECLAMATION BUREAU.

FORM 11 11-21-10M	TO THE TREASURER OF THE	
Voucher No. <u>11-92</u>	Salt River Valley Water Users' Assn.	Check No. <u>31051</u>
	Phoenix, Ariz.,	November 26, 1923.
Pay to the Order of	COMMISSIONER, BUREAU OF RECLAMATION	
	\$ 609,961.32	
<u>SIX HUNDRED NINE THOUSAND NINE HUNDRED SIXTY ONE AND 32/100</u> ----- Dollars		
In Full Settlement of Attached Statement		
TO THE	Salt River Valley Water Users' Association	
VALLEY BANK	By <u>[Signature]</u>	PRESIDENT
PHOENIX, ARIZ.	<u>[Signature]</u>	SECRETARY

A few more like this would help.

THE largest amount of money ever paid in a bulk sum to cover construction charges on a Government reclamation project has been received at the Department of the Interior.

It was a check for \$609,961.32 from the Salt River Valley Water Users' Association, Phoenix, Ariz., of the Salt River

project, one of the successful projects built by the Bureau of Reclamation. Since 1917 the entire management of this project has been in the hands of the water users' association, the Government being relieved of the expense of its operation and maintenance.

The check just received represents the

regular sixth annual payment of the total cost of the project due last month. Future payments due from the water users include \$200,000 next March, \$200,000 next August, and \$949,000 in December, 1924, after which annual payments of \$600,000 will continue until the entire construction cost is paid.

A SETTLER TELLS HIS STORY

A settler on the Carlsbad project in New Mexico writes the following letter to the Engineering News-Record in answer to the question: "What is the Matter with Reclamation?"

SIR: To the reclamation settlers the reply to the editorial query, "What Is the Matter with Reclamation?" raised in your issue of October 25, seems a very simple one. After 21 years there is not a project upon which the construction debts, first crediting all payments which have been made, are not greater than they were before payments began, or when original contracts were made. Always under the same direction and control, the settlers have steadily sunk farther and farther in debt, in spite of payments.

To them the basic problem seems to be not engineering, not political, although related to and complicated by both engineering and politics, but strictly economic. How shall reclamation pay out?

In other words the reclamation settler is in very much the same condition, in contrast to the average farmer, which the little boy complained to his mother:

"Ma, these pants are tighter than my skin." "Nonsense, Johnny, there's nothing tighter than your skin." "Yes, Ma, these pants are; I can sit down in my skin, but I can't sit down in these pants." Our reclamation clothes don't fit us. They were built by engineers and politicians according to preconceived theory and the general opinion seems to be that we were made wrong and must be altered to fit them. If we lose a toe or finger, arm or leg, in the process or have rather frequent funerals, that is only what is naturally to be expected and should not cause protest, or repudiation of what we never were consulted about, because the Civil Service Commission and the American Society of Civil Engineers have O. K'd the architects and approved the patterns, and the only other side of the question is politics.

We have the right, as one distinguished engineer stated briefly and emphatically a few years since, "only to pray and pay." If we criticise, we will start against us "the influence of the most powerful engineering organization in the world." Is this true?

Reclamation settlers have seldom been able to feel that the engineers in the

service as a class and as an organization take a human, or often even a humane, interest in our personal problems and welfare. Due chiefly to this fact we feel they are not properly qualified to direct to ultimate success a problem so complicated with the human element as reclamation, in contrast to strict engineering. This feeling seems to be justified both by the condition of the reclamation fund and by the present trend of the discussion of the problem by engineering societies and journals; as if the technical and not the human factor is paramount, and entirely ignoring the settlers' wishes or opinions.

It is on the human and economic side that reclamation is failing, so that the fund has ceased to revolve, and it is upon this ground that Secretary Work's action must be studied and sustained or condemned.

The very able series of articles upon reclamation now running in Engineering News-Record will fail to properly enlighten your readers to answer your own question unless you also present the settlers' viewpoint.

FRANCIS G. TRACY,
President Pecos
Water Users' Association.

CARLSBAD, N. MEX.,
November 15, 1923.

COOPERATIVE MARKETING ON STRAWBERRY VALLEY PROJECT.

Knowledge of market conditions is essential to the proper distribution of the crops produced on the projects.—Collective bargaining, through cooperative marketing, must replace individual effort if full success is to be obtained.

DURING the past three years there have been organized on the Strawberry Valley project, Utah, nine cooperative marketing associations, embracing fruit, vegetables, dairy, and poultry producers. Three were formed during 1921 and 1922 and six during 1923. These associations were fostered by the County Farm Bureau and County Agricultural Agent in an endeavor to obtain for the producers the best price for their products through better grading, selection, and marketing machinery. The fruit and vegetable organizations are affiliated with the Federated Fruit and Vegetable Growers (Inc.), a nation-wide distributing agency. The poultry associations are affiliated with a State-wide organization which handles and ships their products to eastern markets.

The majority of the farmers are beginning to realize that the consumption of their crops is just as important as production and that selection and grading of products are essential to successful bargaining in competitive fields. Knowledge of market conditions and proper movement of products must be carefully studied. Individual effort must be replaced by collective bargaining if success is to be obtained and reasonable prices received for what is raised.

The benefits resulting from these cooperative associations may be stated as follows:

1. The pooling of produce and marketing it throughout the season at the best obtainable price. All fruit and produce are packed for shipment under a United States inspector into grades called "U. S. No. 1" and "U. S. No. 2." This is not a compulsory measure on the part of the United States, but is taken as a protective measure against the condemnation of fruit at its destination. Under the above-mentioned supervision the producer does not lose even if the product is turned down at its destination as his responsibility for its care and quality ceases at the time it has been received at the shipping point and graded according to its quality. By selling in this manner and by having it within the power of the manager to fill orders according to his best judgment and on account of having a reasonable quantity of produce on hand with which to fill such orders, it is considered that better service can be given to the buyers of the product. Better railroad service is also obtained,

THE HARDING MEMORIAL

To all officers and employees, Department of the Interior:

The friends of former President Harding have formed an association to erect a memorial to his memory, of which association President Coolidge is honorary president. The association desires to afford all friends and admirers of the late President an opportunity to contribute to this memorial, and, while no solicitation is contemplated, it is believed that the officers and employees of the Department of the Interior may desire to make voluntary contributions to this worthy cause.

Therefore any persons desiring to submit such contributions may do so to the chief clerk of the bureau or office in which he or she is employed. Probably nearly all of the employees of the department will desire to be represented in this work, and contributions of any size will be appreciated.

Contributions of officers and employees of field services may be made through their immediate chiefs.

All contributions received by the various bureaus, offices, and field divisions will when completed be transmitted to the chief disbursing clerk, Department of the Interior, Washington, D. C., who will receive and account for same, and they will thereafter be transmitted by the Secretary of the Interior to the Harding Memorial Association.

HUBERT WORK,

Secretary.

and it is not necessary for individuals with less than carload lots to combine for the season in order to dispose of their produce. By having everything graded into two classes and by rigid inspection, it is estimated that at least 10 per cent better prices are obtained than when inspection is not made.

2. Purchasing cooperatively all spray material, fruit boxes, baskets, and other necessities. When spray material, fruit boxes, baskets, and needed materials are bought by the association in large quantities, a lower price is obtained and a guarantee of payment for charges for these materials is made by the association.

At least 60 to 90 days' time is given within which to make payment and the producer is thereby enabled to pay for such materials as he needs after his fruit has been marketed and settlement received by him for it.

3. Raising the standard of inspection and thereby raising the quality of the product put on the market. The method of standard inspection incites the initiative of each producer to take better care of his orchard, to spray, cultivate, and irrigate it in such a way as will bring all his produce into the No. 1 class. Buyers are usually willing to pay from 10 to 15 per cent more for well-graded produce. The percentage of unmarketable produce gradually becomes smaller as every farmer is anxious to have his product pass the highest grade because the price he receives therefor is commensurate with its grade.

4. Arranging demonstrations on spraying, pruning, packing, and the general care of orchards as well as other educational features for the farmer in his particular line of activity. By having cooperative organizations it is much easier to get the producers together for various demonstrations in pruning, packing, and other matters. The county agricultural agent is better able to cooperate along these particular lines; and other public officials are able to render service for the advancement of the organizations, both in the way of educating the farmer and in establishing an ethical practice in the organization itself.

The success attained by the cooperative associations already formed is leading other farming interests to organize; and active steps are now being taken under the auspices of the local farm bureaus to organize and incorporate the wheat growers, sugar beet producers, and livestock interests so that they may likewise pool and market their crops under better conditions.

Overirrigation, causing seepage, especially on lowlands, is a constant menace to the permanence of irrigation agriculture. There is danger in having the water table approach the surface and in becoming dependent upon drainage.

The plains of Ninevah and the Valley of Mesopotamia lie barren to-day, a result, in part, of overirrigation in the days of their glory.

IT HAS NOW BEEN DONE

ON February 21, 1913, over ten years ago, the following bill was introduced in Congress by Representative Hayden and referred to the Committee on Irrigation of Arid Lands, but was never enacted into law.

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby created the office of Director of the Reclamation Service, which shall be filled by appointment by the President, and such appointee shall possess the qualifications of having had experience in the irrigation of arid or semiarid lands

and a general knowledge of agriculture as practiced on such lands, also such other business qualifications as the President may determine as suitable and necessary in the performance of the duties devolving on such officer. He may be removed by the President for incompetency or other disqualifying causes deemed sufficient. The salary of such Director of the Reclamation Service shall be at the rate of \$7,500 per annum, to be paid from the reclamation fund."

The object of this measure was accomplished in 1923 when Secretary of Interior Work changed the administrative organization of the Reclamation Service.



The humble but well-kept home of a homesteader on the Umatilla project.

CANTALOUPEs MAKE GOOD RETURNS FOR FARMERS

Cantaloupe growers in the neighborhood of Las Cruces, Dona Ana, Mesilla Park, Vinton, and Canutillo, on the Rio Grande project, New Mexico-Texas, received approximately \$275,000 for their products during the past season. This amount represents the net sales price coming to the farmers for their melons.

The growers in the upper valley shipped out 522 cars, the average car containing 724 crates. About 1,400 acres were planted in melons, which means, it is figured, a net return to the growers of a fraction less than \$200 per acre. The production averaged 270 crates to the acre shipped, in addition to those consumed locally and shipped in small quantities to near-by markets.

PROPOSE BILL TO DEFER PAYMENTS

It is understood that a bill, authorizing the Secretary of the Interior to defer dates of payments of charges, rentals, and penalties on reclamation projects, will be introduced by Senator L. C. Phipps, of Colorado, and Representative S. E. Winter, of Wyoming, in the Senate and the House simultaneously at the reconvening of Congress after the Christmas holidays. A copy of the bill follows:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Interior is hereby authorized and empowered, in his discretion, to defer the dates of payments of any charges, rentals and penalties which have heretofore accrued or may hereafter accrue prior to the first day of January, 1925, under the act of June 17, 1902 (32 Statutes at Large, page 388), and amendatory and supplemental acts, as may, in his judgement, be necessary to the making of rearrangements and readjustments in or concerning any irrigation project now existing under said act: Provided, however, That interest at the rate of six per centum per annum on the amount of each payment so deferred shall be collected in lieu of any penalties that may now be provided by law in cases of delinquencies in such payments: Provided further, That no payment shall be deferred in any particular case beyond the date on which the last payment of construction charges shall be required by law to be made in the case, thereby permitting the distribution of the deferred payments over the life of existing contracts."

In the last year the farm price of sheep has risen from \$4.80 to \$7.50 a head; the farm price of wool has increased from an average of 29 cents a pound in 1922 to 38 cents in 1923.



Party of railway officials and others admiring the mammoth Duroc-Jersey boar "Typefinder" exhibited at the South Dakota Feeder Hog Show.

THE ALMOND INDUSTRY ON THE ORLAND PROJECT.

Producing orchards, which are valued at \$500 per acre, yield an average of 1,000 pounds of nuts per acre at an average market price of 17½ cents per pound, making a net return to the growers of about \$75 per acre.

ALMONDS have been grown in the Orland vicinity for many years, and there are some orchards now included in the Orland project—one of which produced 1,000 pounds per acre during 1923—that are 35 years of age. These particular areas were in bearing at the inception of the project and clearly demonstrated the adaptability of certain types of Orland soils to the successful production of almonds.

There has been a rapid expansion of the area devoted to almonds. The original area at the inception of the project was about 75 acres, whereas for the season of 1923 more than 1,100 acres were reported in the bearing state, a fourteen-fold increase in the industry during the period of 13 years since the first operation of the project by the Bureau of Reclamation. The increase in production area has been greater for almonds than for any other crop produced on the project.

The almond requires a deep, fertile, and well-drained soil for best results and for this reason the gravelly areas of the project are best adapted and are most used for planting to almonds. The moderate temperatures prevailing at Orland, especially during the season of blossoming late in February and early in March, render the industry practically immune from frost damage. When properly pruned for protection against sunburn, the tree thrives in the high temperatures of summer months.



Almond huller in operation, Orland project.

An abundant supply of humus is essential and for this reason the best almond groves of the project are on areas which previously have been devoted to alfalfa. After planting, the natural and volunteer clover crop, consisting mainly of burr clover and filerie which flourish during the winter and spring months,

supplies the necessary humus, although barnyard manure is valuable especially on the more gravelly soils.

The nuts mature and are ready for harvest during August. The crop is gathered by knocking the nuts from the trees by means of poles onto a canvas spread on the ground and attached to a low sled. After hulling, the nuts are placed in thin layers on trays and exposed to the sun for thorough drying, after which they are sacked in labeled sacks provided by the California Almond Growers' Exchange and shipped in carload lots to market.

There are certain Orland orchards that have produced a yield of 2,100 pounds per acre. This yield, however, is obtained only on the best producing trees and a normal yield from average producing orchards is considered to be 1,000 pounds per acre. Such producing property is valued at \$500 per acre. Computing interest on this investment on property producing a yield of 1,000 pounds per acre at an average market price of 17½ cents per pound and after providing for the necessary expenditures for operation and maintenance charges, plowing, cultivation, irrigation, spraying, pruning, harvesting, and hulling, together with taxes and installments of the project building charge, the almond industry at Orland will net a return of about \$75 per acre, an attractive result from a financial investment viewpoint.



Gathering almonds, Orland project.

CROP CONDITIONS ON THE PROJECTS.

THE following is a brief summary of crop conditions on the irrigation projects of the Department of the Interior, Bureau of Reclamation, at the end of November:

Yuma project, Arizona-California.—The cotton crop continued up to the estimate, and at the end of the month 10,800 bales had been ginned. The local price was 35½ cents. Fall hay was being cut, the price at the end of the month being around \$20 per ton. Between 400 and 500 acres of lettuce were planted. Fruit from the older orchards on the mesa was commanding a ready market in California.

Orland project, California.—Picking, grading, and shipping of oranges were in full swing, and 11 carloads had been shipped. Milo was practically all harvested.

Grand Valley project, Colorado.—The crop census indicates an average gross value per acre of \$46 in 1923, as compared with \$31 in 1922. Taken as a whole, this has proved to be the best season the farmers have had since 1920, and the feeling among the water users is distinctly optimistic. Many farmers this year secured sufficient returns to practically clean up all debts accumulated during the past three seasons, and the outlook for the future is encouraging.

Uncompahgre project, Colorado.—Harvesting of all crops was completed. The initial payment to sugar-beet growers for the 1923 crop was made by the Holly Sugar Co. at the rate of \$6 per ton. A portion of the onion crop was still held in storage in anticipation of higher prices.

Boise project, Idaho.—A very heavy apple crop has been harvested and a good deal was stored in hopes of a better market. The third cutting of hay was in the stack. As a whole the lettuce crop did not prove very profitable. The potato market was dull.

Minidoka project, Idaho.—All crops were harvested and a large amount of fall plowing was done. The yield of sugar beets was estimated at about 140,000 tons. The Amalgamated Sugar Co. made its first payment on the 1923 crop, amounting to \$400,000 for beets delivered in October, based on the minimum price of \$5.50 per ton. The Potato Growers' Association shipped 82 cars of potatoes during the month, or more than double the number handled in October.

Hunley project, Montana.—The sugar-beet crop was all out of the ground and practically all delivered. The yield per acre will not be so large as at first anticipated, owing chiefly to the fact that large

acres were pulled long in advance of hauling for fear of their being frozen in the ground, which resulted in a heavy shrinkage in weight.

Milk River project, Montana.—The sugar-beet crop was harvested and shipped. Considerable baled hay was shipped from the Chinook division at \$11.50 f. o. b.

Sun River project, Montana.—Farmers were engaged in harvesting sugar beets, baling hay, marketing farm products, and completing late threshing.

ECHOES FROM BOISE

I SOLD 36 cars of apples from my 60-acre orchard this year and got \$21,000 f. o. b. Beatty station and return."—N. P. Nelson.

"Fattened 1,400 hogs in the last four years and raised all their food except \$196 worth. I have sold \$2,200 worth of hogs this year."—Don A. Whittig.

"Two hundred and fifty hens brought me \$1,051 this year."—W. E. Baker.

"I grew 20 tons of ensilage and 110 bushels of corn to the acre this year. Sixteen milk cows, scrubs, make me on the average of \$1,975."—Charles A. Johnson.

"All a man has to do in Boise Valley is to put seed and water on the ground, spring tooth his meadow, and it will raise hay. I have refused \$15 per ton for hay."—W. F. Fehlhaber.

Lower Yellowstone project, Montana-North Dakota.—The sugar-beet harvest was completed early in the month. Many farmers were engaged in husking corn.

North Platte project, Nebraska-Wyoming.—All sugar beets were harvested owing to the favorable weather. Those farmers having beets appeared to be in a better financial condition and there was some cleaning up of chattel and miscellaneous indebtedness. Generally speaking, the situation of the farmers appeared to be improving.

Newlands project, Nevada.—Winter wheat was reported in good condition. Heavy shipments of alfalfa were made at \$14 per ton f.o.b. Fallon. The crop cen-

sus indicates that excellent yields of various crops were obtained.

Carlsbad project, New Mexico.—Cotton picking was in progress, and at the end of the month 6,862 bales had been ginned, representing about 75 per cent of the crop. Prices ranged from 30 to 36½ cents per pound. The price of alfalfa at the close of the month was \$24 baled f.o.b. the project. Fall plowing had begun.

Rio Grande project, New Mexico-Texas.—Cotton picking was practically completed. The large yield and exceptionally high prices have been favorable to the farmers.

Williston project, North Dakota.—All crops, except hay and grain held over for feed, have been disposed of.

Umatilla project, Oregon.—Most of the season's crop of apples was still on hand, as there was practically no demand. The prices offered would barely pay for picking and packing. There was little demand for hay.

Klamath project, Oregon-California.—Harvesting of all crops was practically completed. Some grain remained to be cut and threshed in the Tule Lake division.

Belle Fourche project, South Dakota.—Crops were practically all harvested. A large proportion of the big corn crop was being grazed off by sheep and hogs. Small grain crops were poor. The hay crop was heavily damaged by rain, resulting in very little marketable hay for outside markets. Hay suitable to bale has been largely contracted for at \$12 to \$15 per ton f.o.b. local stations.

Strawberry Valley project, Utah.—Crop yields generally were excellent with the exception of the sugar-beet crop on the High Line division where the beets for some unknown reason were smaller than usual. Fall wheat was doing well.

Okanogan project, Washington.—At the end of the month the apple crop had been shipped or stored for a better market. The market was still weak and in many cases the returns were below the cost of production and marketing. Prices on later varieties were better than for the early varieties.

Yakima project, Washington.—Practically all crops were harvested. The demand for apples was unsatisfactory and most of the crop was stored for a better market later. The market for hay and potatoes was also poor.

Shoshone project, Wyoming.—Harvesting of sugar beets and threshing of grain were in progress, and the sugar beets had been nearly all shipped. The bean crop suffered some damage from late storms. There was little marketing of potatoes during the month, but toward the end of the month the market appeared to be strengthening. Many farmers were engaged in baling and hauling hay.

CONSTRUCTION OF THE WIND RIVER DIVERSION DAM.

Begun in July, 1921, the completion of this dam, at a cost of less than half a million dollars, will provide for the diversion of water from Wind River for the irrigation of more than 100,000 acres of otherwise arid land.



Wind River diversion dam as completed, except for an 8-span steel bridge to be erected by the Wyoming Highway Commission.

CONSTRUCTION of the Wind River diversion dam by Government forces marks the completion of the first large single structure on the Riverton project in Wyoming and permits the diversion of sufficient water from Wind River, a tributary of the Big Horn River, for the irrigation of over 100,000 acres of arid land in the Wind River Valley, in Fremont County, Wyo.

The diversion dam consists essentially of a concrete spillway 651 feet long across the main river channel, with a sluiceway, logway, and canal headworks at the north end, and an earth embankment 1,656 feet long connecting the south end of the spillway with the river bluff. The structure was designed for a maximum capacity of 40,000 second-feet, which corresponds to a head of 6.45 feet on the spillway crest and a 5-foot freeboard for the embankment.

The masonry part of the dam rests on bedrock and has a maximum height of 35 feet. A fish ladder is provided at

the south abutment. By agreement with the Wyoming Highway Commission, bridge piers were built as an integral part of the weir and the commission is to erect an 8-span steel highway bridge prior to December 31, 1924.

Both the headworks and sluiceway are equipped with steel radial gates, counterweighted and raised by double drum hoists operated by a gasoline engine moving on track. There are six 10 by 10 foot gates in the headworks and four 10 by 12 foot gates in the sluiceway. The logway is provided with a wooden gate 10 feet wide.

Excavation for the entire concrete structure was carried to a suitable rock foundation, which proved to be shale and soft brown sandstone under the headworks and a tough bluish argillaceous sandstone under the spillway and sluiceway. The upper material consisted of sandy loam, cobblestones, gravel, and river sand varying in depth from 7 to 15 feet, except for a hole at the south end of

the spillway where the depth to bedrock was 27 feet. A gasoline drag line performed the bulk of the excavation, and the material was cast above and below the site to form dikes which served as cofferdams. The cut-off trenches were excavated by drilling, channeling, and light blasting, air for the drills being supplied by gasoline engine driven air compressors.

Most of the concrete aggregate was obtained from river gravel located at the site. The gravel was cast by drag line on a 3-inch grizzly and the oversize cobbles retained for use as plum rock. Material passing the grizzly was then delivered by drag line or slips to a portable screening plant of 25-cubic-yard capacity, having a 30-inch two-section screen with $\frac{1}{4}$ -inch and 1-inch perforations.

Cement was hauled from Riverton to a cement house of 3,000-sack capacity built on a ledge above the headworks, whence it was chuted direct to the concrete mixer or to cement cars.

In concreting the lower portion of the headworks, sluiceway, logway, and a small portion of the weir, the mixer, which was power-operated and of $\frac{1}{2}$ -yard capacity, was installed at the silt basin above the sluiceway. Material from the screening plant was hauled by teams in $\frac{1}{2}$ -yard cars up an inclined trestle and emptied into stock bins located just back of the mixer. The power charger on the mixer was filled directly from the bins; mixing water was pumped from the river. Concrete was delivered in place through chutes wherever possible and elsewhere by $\frac{1}{2}$ -yard side-dump steel cars on narrow-gauge track or by wheelbarrows where the concrete had to be elevated.



Plan of the Wind River diversion dam, Riverton project.

FROM THE BENCH AND BAR.

THE American and British Claims Arbitral Tribunal, sitting in London, England, has dismissed the so-called Rio Grande claim of about \$4,000,000 plus interest, presented by British subjects against the Government of the United States. The claim is based on an alleged interference by this country with the rights of an English company called the Rio Grande Irrigation & Land Company (Ltd.), which about 1896 took steps to construct an irrigation dam in the Rio Grande near where the Elephant Butte dam of the Rio Grande Federal Irrigation project was subsequently located. The claimant company's interests were the subject of prolonged and hard-fought litigation in the courts of the United States. The litigation proceeded in regular course three times from the Territorial District Court for the Third Judicial District of New Mexico to the Supreme Court of the United States, and three decisions were handed down by the latter court involving the matters which were later made the basis of the claim which has now been dismissed.

One acquiring title to land in an arid country which is subject to and relies on an irrigation project is charged with notice of the provisions of the articles of incorporation relating to the manner of operating and maintaining such project. Where the articles of incorporation of an irrigation association provide that its stock is inseparably appurtenant to land of a shareholder and that assessments, "until they are paid or otherwise discharged, shall be and remain a lien on the land of the shareholder against which they are levied and upon the shares of stocks appurtenant to said lands," an assessment levy for corporate purposes is superior to a prior mortgage lien and is enforceable regardless of ownership, it being immaterial whether the mortgagee or a purchaser of the land had actual knowledge of the lien or the corporation's power to create one by levying an assessment. (*Greene & Griffin Real Estate & Investment Co. v. Salt River Valley Water Users' Association*, (Ariz.), 217 Pac. 945.)

In considering whether a valid claim to unsurveyed lands has been initiated, the initiatory act need not be identical with the actual residence required by the homestead law, but that which shows

good faith under the particular circumstances will be sufficient. Where unsurveyed land has been entered upon by bona fide claimants, who have posted notices and exercised acts of ownership, although insufficient under the homestead law, such land is segregated from the public domain, and not subject to entry by a railway company under the Federal law of August 5, 1892, (27 Stat. 390) permitting such company to select certain nonmineral land (*Reed v. Great Northern Ry. Co.* (Wash.), 218 Pac. 210.)

The water of a spring situate wholly upon Government land is subject to appropriation for beneficial use. One who makes a filing upon any unoccupied public land takes the same subject to any vested and accrued water rights for domestic, mining, agricultural, manufacturing, or other purposes which are recognized by the local laws, customs, and decisions of courts. One who acquires by appropriation the right to the use of the water of a spring situate wholly upon Government land may restrain a subsequent patentee of such land, or his successor in interest, from any interference with the use of such water or the easement over which the same is conducted to his premises. (*Keiler v. McDonald* (Idaho), 218 Pac. 365.)

It is within the incidental powers of a corporation organized primarily for irrigation purposes, but authorized to construct power houses and transmission lines, and to create, transmit, and use power for the accomplishment of its purposes, also to install in the river, below its reservoir, a second dam, for the purpose of catching water released from above and using it again to develop power, thus enabling the association to furnish power throughout the year and secure a more advantageous market than would otherwise have been possible. (*Orme v. Salt River Valley Water Users' Association* (Ariz.), 217 Pac. 935.)

A landowner, who besides irrigating his own farm from his well supplied certain neighbors regularly and still others occasionally with such surplus water as he could spare, for which he charged a certain hourly rate, held not to have dedicated his work to a public use so as to entitle the public generally to demand water service as a matter of legal right.

(*Richardson v. Railroad Commission* (Calif.), 218 Pac. 419.)

A valid formal contract securing to the United States the right to electric current at specified rates for the fiscal year in which executed, with the right of renewal from year to year for a limited period without any increase of rates, may not, by supplemental contracts within the time allowed for notice of renewals and without any consideration moving to the United States, be changed to increase the rates to be paid by the Government within the authorized renewal period. (2 Comp. Dec. 812.)

Where two causes contribute to an injury, one of which is an act of God such as an unprecedented flood, and the other is the negligence of the defendant, the latter is liable for such loss as is caused by his own act concurring with the act of God, provided the loss would not have been sustained by the plaintiff but for such negligence by the defendant. (*Raish v. Orchard Canal Co.* (Mont.), 218 Pac. 655.)

Liability for damage to another's land by flooding is not to be assumed without proof of some fault or negligence. One attempting to dam or store water or to divert a stream is not an insurer, but he must use care commensurate with his undertaking, and must make the structures sufficiently strong to resist the waters which he ought reasonably to anticipate, and must use reasonable care to maintain them of sufficient strength for that purpose. (*Eikland v. Casey* (Alaska), 290 Fed. 880.)

The only question that can be considered by the courts regarding the decisions of the Land Department of the United States is whether the department made a mistake of law; and to hold that it did, it must be clearly manifest, and not founded on possible finding of the facts different from that put on them by the department. (*McDonald v. Neal* (Wash.), 218 Pac. 228.)

Where a Government contract for the procurement of such services as electric current, gas, heat, water, refrigeration, and fire-alarm service made for one fiscal year contains a provision for renewal from year to year, the renewal thereof need not be formally executed in the manner required by section 3744 of the Revised Statutes in the case of original contracts. (2 Comp. Dec. 810.)

DR. MEAD BEGINS WORK ON ADVISORY COMMITTEE

RETURNING from a nine-months' trip to Australia and the Holy Land, where he served as reclamation consultant for the British Government, Dr. Elwood Mead of Berkeley, Calif., distinguished irrigation engineer, has begun to serve as a member of the Special Advisory Committee to which he was appointed when Secretary of the Interior Work named his original members last September.

Doctor Mead recently arrived in New York from Jerusalem and proceeded to Washington where he formally joined the committee. Dr. Mead was employed by the Australian Government for many years to organize the settlement activities on its irrigated lands, and during his recent trip served on a British commission to investigate the difficulties that have developed in connection with Australian reclamation. He also spent a month in Palestine, where at the request of the Zionists he traveled over the country with a view of passing on the advisability of reclamation projects in the Holy Land.

After spending a short time in Washington Dr. Mead left for Berkeley where he is a professor of rural institutions of the University of California and will join the Special Advisors when its members begin next month a tour of a number of reclamation projects in the West. Following this visit of the committee he will return with them to Washington and

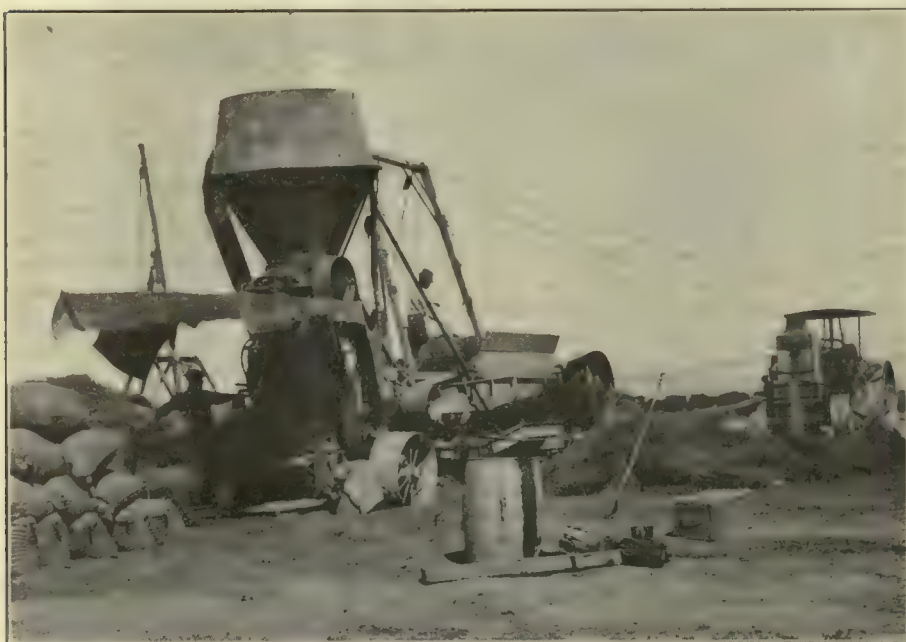


Peaches are one of the sources of revenue to the water users on the Newlands project, Nevada.

assist in the preparation of the final report of the committee that will be made to the Secretary of the Interior to be later submitted to the President and to Congress.

Doctor Mead is regarded as the most prominent irrigation engineer in the United States. After his work in Australia he came back to this country and conceived the idea of settling irrigated lands in California with the application of new economic principles and as a result the two famous California colonies

at Delhi and Durham, known the world over, came into successful operation. Doctor Mead is a member of the American Society of Civil Engineers and the British Institute of Engineers. He was the engineer for the State of Wyoming from 1888 to 1889; chief of irrigation and drainage investigations of the United States Department of Agriculture in 1897; chairman of the State rivers and water supply commission in Victoria, Australia, from 1907 to 1915; consulting engineer for various irrigation works, and author of articles and books on irrigation and engineering subjects.



This portable alfalfa meal mill, a number of which are found on the projects, has a capacity of 30 tons per day.

PUREBRED SHEEP BRING GOOD PROFIT TO OWNER

C. S. Phillips, a sheepman and farmer on the Minidoka project, Idaho, received \$1,640 recently for 60 head of sheep. They represented the last two years' crop of rams raised by Mr. Phillips from his band of 83 thoroughbred black-face Hampshire ewes. Twenty-nine of the rams were yearlings and brought \$35 per head. The remaining 25, which were last spring's lambs, sold for \$25 each. They were bought by F. D. Carpenter, of Montrose, Colo.

In many instances a yearling and a spring lamb were the offspring of one mother, making a total of \$60 brought in by the one ewe in the course of two years, or \$30 a year besides the clip. In some instances twins and even triplets had been raised, making two and three times this amount.

MATE YOUR POULTRY SCIENTIFICALLY.

"WHEN the monk Mendel planted his garden with peas," says H. O. Numbers, secretary of the Pennsylvania State Poultry Association, "and relentlessly watched the results of hybridizing his different species, he little dreamed the mighty influence his discovery meant to poultry culture. From the Mendelian theory we have evolved valuable principles of proper matings of poultry.

"The fundamental basis of successful poultry husbandry is a knowledge of what type, color, or variety of male to mate to corresponding females, or vice versa, in order to obtain a desired result. Upon the knowledge of these principles depends the propagation of standard bred fowls, color, type, and a score of other important essential characteristics necessary to the continuance of our domestic fowl.

"The farmer who, without consideration and in a haphazard manner, throws a male bird into his flock as a breeder, and who works on the theory that a 'rooster is a rooster' regardless of his qualifications, seldom shows anything but a mongrel display. The successful breeders of to-day make a minute study of their hens. They know their idiosyncrasies as well as fond parents know their children's. Characteristics and temperament are important factors. A pen of high-tensioned, nervous hens should not be mated to a male bird of like temperament.

"An old breeder of a certain white variety once told me the reason he bred such marvelous birds, and the reason he always won everywhere he exhibited, was because 'he always mated opposite temperaments, and because he mated a bluish white male to a creamy white female,' producing a pure white progeny.

"From the Mendelian deductions, we note the 'dominant' characteristics, and 'reversion or atavism.' These are the more conspicuous; hence a brief comment. In the offspring of certain matings one characteristic is dominant over the other. Let me illustrate: Suppose we mate a single comb to a flock of rose combs; the result will be rose combs. The latter is dominant over the former. The results of matings of the American class often show stubs on the shanks. These did not appear on the immediate parents, nor on their ancestors, but undoubtedly did exist on the ancestors many generations back, which had been used to make the breed. This characteristic is known as 'reversion.'

"Let us consider another important factor of mating, prepotency. By this we mean the ability of an individual to

transmit its qualities to its offspring. The degree of prepotency can be determined only after the maturity of the offspring. It therefore behooves the farmer who has had good results from either male or female lines to continue to use such individuals as long as their fecundity exists.

"It is not my thought to bewilder you with a lot of theory. I do want to bring to your notice the necessity of a scientific knowledge of poultry culture. On the surface, 'chicken raising' looks simple,

ORLAND PROJECT AGAIN PAYS UP ON DUE DATE

On December 1, 1923, the Orland Unit Water Users' Association remitted to the local fiscal agent the sum of \$66,574.37, discharging in full the eighth instalment of the project building charge due on that date.

Upon receipt of this welcome news from Project Manager Weber, Commissioner Davis wrote to him as follows:

"It is a great pleasure to hear of this continued evidence of the success and cooperative spirit on the Orland project."

The Orland project has for years been an excellent example for other projects to follow.

but if you would expand, or if you would profit, you must go to the bottom and know the fundamental basis of proper mating.

"Recently I met a man who had cleared over \$3,000 last year, as a side line, with a few chickens on a plot 100 feet square. This man was a scientific poultryman. He produced quality, not quantity.

"The month of January is 'mating time.' Use discretion. If you do not know how to mate, ask an authority. Too often the male side is weak. Strengthen your flock by infusing the right kind of blood. I recently required a certain type male bird to complete a mating. I spent several months in search of the proper individual. It was not a question of price, but just to get exactly what I wanted. I looked at birds priced from \$5 to \$50. Last week I happened on a farmer's flock and saw the very bird I wanted. I bought him for \$2. To-day I would not sell him, for I believe he possesses all the qualities I require. Just remember that not always the highest priced is the best for your requirements. It may be a show winner, but will be deficient in the breeding pen.

"The subject of proper mating is infinite, and if space would permit we might discuss a few of its phases. However, I trust that you will grasp the keynote of this article, 'scientific mating 'nets' 'resources, not liabilities.'"

Although a good farmer may accomplish much with poor equipment, he can do much more if his plant and equipment are properly designed and arranged.



Juicy, golden oranges from an irrigated orchard on the Salt River project.

PROJECT MANAGERS MAY NOT OWN LOCAL FARMS

Managers of Government reclamation projects will not be permitted to own and operate farms on the projects in which they are in charge in the future, according to a legal ruling made recently at the Interior Department and approved by the Secretary of the Interior.

The action was based on complaints of settlers and water users on several projects where managers have secured possession of farms. In adopting a definite policy against the practice the ruling quotes an order contained in the Reclamation Manual adopted in 1912 prohibiting officials in charge of projects from acquiring interest in property on their projects. The regulation reads as follows:

"No superintendent of irrigation, engineer, or other officer or employee in responsible charge of a reclamation project or unit of project will be permitted to acquire any interest in property within that project. This prohibition does not extend to laborers or assistants whose duties are confined to carrying out instructions given by chiefs, but only to such men as initiate and put into

TENANT FARMERS BUY FARMS OF THEIR OWN

THE sales of 12 farms have been negotiated recently on the Rio Grande project, New Mexico-Texas, representing an aggregate consideration of \$120,000. Of the 12 purchasers, 11 were local men, all of whom were tenant farmers last year, farming the land on shares. The money made from cotton enabled them to purchase their own farms this year.

Eight of these men, it is stated, did not have a dollar last year. They rented farms, and being real farmers, raised fine crops. In this connection the opinion was expressed that the tenant farmer makes the best land owner. He has learned the soil and the business of farming from the ground up. He never overbuys, but purchases only the amount of land which he knows can be cultivated to the best possible advantage. As a result, he is the best sort of farmer.

effect those matters which are left to judgment and discretion."

YAKIMA POTATO GROWERS PLAN TO REDUCE LOSSES

In the Yakima Valley, Wash., potato growers are working on plans to prevent a repetition of losses suffered in the last few years from lack of a readily accessible market. Probably the Yakima Valley produces larger yields of potatoes of the highest grade than any other area in the country. The Yakima reclamation projects in 1922 produced an average of 260 bushels an acre on the 8,442 acres harvested. Yet the growers lost money, and a large part of the crop had to be dumped back on the fields.

To reduce such losses in the future, new plans for marketing the choicest grade of potatoes are under consideration. It is proposed to grade and sort the potatoes, wrap each one in paper, and pack them in small boxes for shipment by the Panama Canal to eastern markets. Potatoes thus packed, it is figured, could be laid down in New York at a cost for transportation of \$1.25 a hundred pounds, and would command premium prices.

A provision of law preventing employees of the General Land Office from entering public lands has long been in effect.

STATEMENT SHOWING SOURCES OF FUNDS MADE AVAILABLE FOR RECLAMATION PROJECTS FROM JUNE 17, 1902, TO JUNE 30, 1923.

Sale of public lands.....	\$105,703,102.69	
Less deduction by United States Treasury for bond loan repayment.....	13,000,000.00	
		\$102,703,102.69
Sale of town sites.....		576,420.68
Sale of potassium.....		16,178.64
Oil leasing act.....		12,195,897.46
Federal water power licenses.....		1,863.75
Bond loan, United States Treasury.....		20,000,000.00
Project collections.....		46,494,377.70
Increase of compensation.....		2,477,374.49
Judgments, Court of Claims.....		550,347.58
Rio Grande dam appropriation.....		1,000,000.00
Wind River Indian (Riverton):		
Appropriation.....	359,479.65	
Collections.....	985.65	
		360,465.30
		186,376,328.29
Less cash on hand:		
Reclamation fund.....	4,649,267.46	
Wind River.....	303.61	
		4,649,571.07
Disbursements.....		181,726,457.22

STATEMENT SHOWING FOR WHAT PURPOSE FUNDS MADE AVAILABLE FOR RECLAMATION PROJECTS HAVE BEEN USED.

Inventory of stock on hand.....		\$1,091,551.17
Plant and equipment.....		2,498,805.58
Civil service retirement fund.....		6,001.73
Construction:		
By United States.....	\$137,057,463.47	
Supplemental.....	\$5,059,658.48	
Less operation and maintenance.....	102,800.00	
	4,956,858.48	142,014,321.95
Operation and maintenance:		
Regular.....	16,927,997.58	
During construction.....	8,890,628.55	
Supplemental.....	102,800.00	
Added to construction.....	928,183.44	
		26,849,609.57
Undistributed:		
Construction.....	24,654.19	
Operation and maintenance.....	6,310.47	
Field legal.....	18,315.38	
		49,280.04
Refunds:		
Construction.....	17,808.58	
Operation and maintenance.....	11,736.60	
		29,545.18
Indian projects:		
Blackfeet.....	951,160.63	
Flathead.....	1,581,295.96	
Fort Peck.....	465,372.65	
		2,997,829.24
Secondary project investigations.....		2,001,956.83
Cost commercial power and light.....		1,273,623.93
Cost townsite development.....		26,028.69
Transfer to Yuma auxiliary.....		275,549.00
Work for outside interests by—		
Denver office.....	126,449.41	
Washington office.....	287,702.91	
Field legal.....	2,610.89	
		416,763.21
Miscellaneous unclassified.....		3,641,769.70
Total.....		183,172,635.82
Less:		
Unpaid material and supplies.....	1,121,760.36	
Unpaid labor.....	324,418.24	
		1,446,178.60
Total expenditures.....		181,726,457.22

¹ The repayments to June 30, 1923 applying on bond loan, have been deducted by the Treasury from land sales before covering into the reclamation fund. At the present time these deductions are being made from receipts from oil leasing act at the rate of \$250,000 every three months.

² The miscellaneous unclassified \$3,641,769.70 represents the costs of sundry items for which only the net profit or loss is taken into account, such as: Sales of mercantile stores, sales of plant and equipment, sales of condemned articles carried in material and supplies, cost of hospital operation, cost of meals sold by mess houses, etc.

ADMINISTRATIVE ORGANIZATION OF THE BUREAU OF RECLAMATION.

DEPARTMENT OF THE INTERIOR.

HON. HUBERT WORK, Secretary of the Interior.
EDWARD C. FINNEY, First Assistant Secretary.
FRANCIS M. GOODWIN, Assistant Secretary.
JOHN H. EDWARDS, Solicitor for the Interior Department.
EBERT K. BURLEW, Administrative Assistant to the Secretary.
JOHN H. MCNEELY, Assistant to the Secretary.
JOHN HARVEY, Chief Clerk.

BUREAU OF RECLAMATION.

WASHINGTON, D. C.

David W. Davis, commissioner; Miles Cannon, field reclamation commissioner; Ottamar Hamel, chief counsel; J. B. Beadle, chief clerk; C. A. Bissell, engineer; J. M. Luney, chief accountant; W. A. Meyer, Yakima, Wash., and W. F. Kubach, Denver, Colo., examiners of accounts.

DENVER, COLO.

F. E. Weymouth, chief engineer, Wilda Building, Denver, Colo.; R. F. Walter and C. P. Williams, assistant chief engineers; Miss L. H. Meisel, secretary to the chief engineer; Barry Dibble, electrical engineer; J. L. Savage, designing engineer; James Munn, engineer; J. R. Ummel, chief clerk; A. McD. Brooks, purchasing agent; Harry Caden, fiscal agent.

PROJECT ORGANIZATION.

Belle Fourche Project.—B. E. Hayden, project manager, Newell, S. Dak.; R. C. Walber, chief clerk.

Boise Project.—J. B. Bond, project manager, Boise, Idaho; E. R. Mills, chief clerk; C. F. Weinkauff, fiscal agent.

Boise Project, Black Canyon Dam.—Walter Ward, construction engineer, Emmett, Idaho; M. J. Gorman, chief clerk; T. W. Hause, fiscal agent.

Carlsbad Project.—L. E. Foster, project manager; Carlsbad, N. Mex.; V. L. Minter, chief clerk and fiscal agent.

Grand Valley Project.—S. O. Harper, project manager, Grand Junction, Colo.; W. J. Chiesman, chief clerk; C. E. Brodie, fiscal agent.

Huntley Project.—A. R. McGinness, project manager, Ballantine, Mont.; H. S. Elliott, chief clerk; Miss M. C. Simek, fiscal agent.

King Hill Project.—George H. Harris, acting project manager, King Hill, Idaho; E. V. Hillius, chief clerk and fiscal agent.

Klamath Project.—H. D. Newell, project manager, Klamath Falls, Oreg.; N. G. Wheeler, chief clerk; G. R. Barnhart, fiscal agent.

Lower Yellowstone Project.—H. A. Parker, project manager, Savage, Mont.; E. R. Schepplmann, chief clerk.

Milk River Project.—G. E. Stratton, project manager, Malta, Mont.; E. E. Chabot, chief clerk; J. T. M. Culbertson, fiscal agent.

Minidoka Project.—Edward B. Darlington, project manager, Burley, Idaho; E. C. Diehl, chief clerk; Miss A. J. Larson, fiscal agent.

Minidoka Project, American Falls Reservoir.—F. A. Banks, engineer in charge, American Falls, Idaho; H. N. Bickel, chief clerk; O. L. Adamson, fiscal agent.

Newlands Project.—J. F. Richardson, project manager, Fallon, Nev.; A. W. Walker, engineer; G. B. Snow, chief clerk; Miss Ethel M. Simmonds, fiscal agent.

North Platte Project.—Andrew Weiss, project manager, Mitchell, Nebr.; H. W. Bashore, engineer, Fort Laramie Division; T. W. Parry, irrigation manager; L. H. Mong, chief clerk; Mrs. A. L. Truax, fiscal agent.

Okanogan Project.—Calvin Casteel, project manager, Okanogan, Wash.; W. D. Funk, chief clerk and fiscal agent.

Orland Project.—R. C. E. Weber, project manager, Orland, Calif.; E. T. Eriksen, engineer; C. H. Lillingston, chief clerk and fiscal agent.

Rio Grande Project.—L. M. Lawson, project manager, El Paso, Tex.; C. A. Peavey, chief clerk; L. S. Kennicott, fiscal agent.

Riverton Project.—H. D. Comstock, project manager, Riverton, Wyo.; L. H. Mitchell, engineer; R. B. Smith, chief clerk; W. J. Fogarty, fiscal agent.

St. Mary Storage Division.—R. M. Snell, project manager, Browning, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Salt River Project.—Being operated by the Salt River Valley Water Users' Association; C. C. Cragin, general superintendent and chief engineer, Phoenix, Ariz.

Shoshone Project.—J. S. Longwell, project manager, Powell, Wyo.; J. R. Iakisch, engineer; C. M. Jump, superintendent of irrigation; W. F. Sha, chief clerk; Miss L. C. Drinkwater, fiscal agent.

Strawberry Valley Project.—W. L. Whittemore, project manager, Provo, Utah; H. R. Pasewalk, chief clerk; W. C. Berger, fiscal agent.

Sun River Project.—G. O. Sanford, project manager, Great Falls, Mont.; H. W. Johnson, chief clerk; F. C. Lewis, fiscal agent; G. A. Benjamin, irrigation manager, Fairfield, Mont.

Umatilla Project.—H. M. Schilling, project manager, Hermiston, Oreg.; G. C. Patterson, chief clerk; Miss M. G. Valentine, fiscal agent.

Umatilla Project, McKay Dam.—R. M. Conner, superintendent of construction; Ralph Lowry, engineer in charge, Pendleton, Oreg.; C. B. Funk, chief clerk; W. S. Gillogly, fiscal agent.

Uncompahgre Project.—L. J. Foster, project manager, Montrose, Colo.; G. H. Bolt, chief clerk; F. D. Helm, fiscal agent.

Williston Project.—W. S. Arthur, project manager and chief clerk, Williston, N. Dak.; H. C. Melaas, fiscal agent.

Yakima Project.—J. L. Lytel, project manager, Yakima, Wash.; R. K. Cunningham, chief clerk; J. C. Gawler, fiscal agent; M. D. Scroggs, superintendent of irrigation, Sunnyside, Wash.; J. S. Moore, superintendent of irrigation, Route 6, Yakima, Wash.

Yakima Project, Tieton Dam.—F. T. Crowe, construction engineer, Rimrock, Wash., C. F. Gleason and W. C. Christopher, engineers; V. G. Evans, chief clerk; C. F. Williams, fiscal agent.

Yuma Project.—P. J. Preston, project manager, Yuma, Ariz.; R. M. Priest, superintendent of construction; D. C. McConaughy, engineer, Yuma Mesa Division; D. C. Caylor, superintendent of irrigation; C. A. Denman, chief clerk; E. M. Phillebaum, fiscal agent.

INDIAN PROJECTS.

Blackfeet Project.—R. M. Snell, project manager, Browning, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Flathead Project.—C. J. Moody, project manager, St. Ignace, Mont.; J. M. Swan, chief clerk; J. P. Siebeneicher, fiscal agent.

Fort Peck Project.—E. L. Decker, acting project manager, Poplar, Mont.; Henry Berryhill, chief clerk and fiscal agent.

FIELD LEGAL OFFICES.

Boise, Idaho.—B. E. Stoutemyer, district counsel. Projects: Boise, Minidoka, King Hill, and Jackson Lake Enlargement.

Denver, Colo.—Legal section office of chief engineer; R. M. Patrick and Armand Offutt, district counsel.

El Paso, Tex.—J. N. Beardslee, district counsel. Projects: Rio Grande, Carlsbad, and Hondo.

Helena, Mont.—E. E. Roddis, district counsel, Helena, Mont. Projects: Blackfeet, Flathead, Fort Peck, Huntley, Milk River, St. Mary Storage, Sun River, Williston, Lower Yellowstone, and Shoshone.

Mitchell, Nebr.—Brooks Fullerton, district counsel. Projects: North Platte, Belle Fourche, and Riverton.

Montrose, Colo.—J. R. Alexander, district counsel. Projects: Grand Valley, Uncompahgre, and Strawberry Valley.

Portland, Oreg.—H. L. Holgate, district counsel, Post Office Building. Projects: Yakima, Okanogan, Umatilla, Klamath, and Baker.

San Francisco, Calif.—P. W. Dent, district counsel, 349 Pacific Building. Projects: Salt River, Yuma, Orland, and Newlands.

WHAT THE SERVICE STANDS FOR.

"UNDER the provisions of the reclamation act the relations of the Secretary of the Interior to your activities and your duties are peculiarly close and intimate. We are members of a great organization engaged in an important creative work. It is my earnest desire to exercise the duties imposed upon me in a manner which will promote the hearty cooperation of all who are devoting their lives to this task.

"I know that the Nation owes much to the pioneers who have wrested an empire from the western arid wastes, for I have lived among them. Their accomplishments have contributed largely to our national wealth and to the stability of our institutions, and their personality has broadened the vision of a people.

"In so far as authority is granted me, I shall gladly extend the services and sympathy of this department in the problems looking toward their advancement."

HUBERT WORK,
Secretary of the Interior.

President Coolidge on Reclamation

“BY reason of many contributing causes occupants of our reclamation projects are in financial difficulties, which in some cases are acute. Relief should be granted by definite authority of law empowering the Secretary of the Interior in his discretion to suspend, readjust, and reassess all charges against water users. This whole question is being considered by experts. You will have the advantage of the facts and conclusions which they may develop. This situation, involving a government investment of more than \$135,000,000, and affecting more than 30,000 water users, is serious. While relief which is necessary should be granted, yet contracts with the Government which can be met should be met. The established general policy of these projects should not be abandoned for any private control.”

*—From the message of the President
to Congress, December 6, 1923.*

The Reclamation Record

Vol. 15

FEBRUARY, 1924

No. 2



A POTENTIAL BUSINESS MAN.

A TRIBUTE TO ABRAHAM LINCOLN

A CHILD of the frontier, born on a corn-shuck mattress, amid poverty and in obscurity, Abraham Lincoln climbed to the very heights of human adoration.

There is no chapter in human history to compare with the life of the Great Emancipator. Unheralded and unwelcomed he came into the world. Glorified and sanctified he left it, crowned with a wreath of immortality.

For years his was a struggle for food, but always he was doing good to others, as he went about. There came a crisis in his country's existence. A Nation appealed for a leader and Lincoln answered it.

With keen penetration of vision, high idealism, and an inspired courage this plain man stood calm and adamant, saving his country from disruption, through the storm of a Civil War which rocked the foundations of government.

Then came the last sleep that is oblivion to most of mankind. But the spirit of this boy of the woods, matured to manhood and consecrated to high purpose, lives after him to inspire youth, to impress men, and to mold history for centuries to come. Maybe, after two thousand years, the world will regard Abraham Lincoln as having been inspired for a divine mission, to perpetuate through the ages spiritual freedom through human liberty.

THE SPIRIT OF IRRIGATION

OUR modern knowledge is teaching the methods whereby irrigation may be used to produce the maximum crops for each unit of water used. All irrigation advocates are rapidly accepting the new truth. The very spirit of the conquest of the desert is that men shall be benefited—many men; the more men the better. The largest possible area of land must be reclaimed by the stored waters, even if the acre-yield does not reach so high an average.

The mighty dams and endless lines of canals will soon be completed. If the work has been well done, we shall need only to maintain in a sound condition the structures of steel and rock and cement and wood and earth that have been built. The overshadowing problem then, as it is the great one now, will be that of using the water in the best manner for the production of crops. Two-headed is this problem: First, the water must be made to produce the largest total yield of crops for the support of man; second, the practice of irrigation on a given area of land must be made continuous and increasingly desirable.

—From "Principles of Irrigation Practice," by Dr. John A. Widtsoe,
Secretary of the Committee of Special Advisors on Reclamation.



LAGUNA DAM AND SLUICE GATES FROM
CALIFORNIA SIDE, YUMA PROJECT.

CUT ON HIGH LINE CANAL, UNCOMPAGRE
PROJECT.



LOOKING ALONG AXIS OF ELEPHANT BUTTE
DAM, RIO GRANDE PROJECT.



THE RECLAMATION RECORD

Issued monthly by the Department of the Interior, Bureau of Reclamation, Washington, D. C.

HUBERT WORK
Secretary of the Interior

DAVID W. DAVIS
Commissioner, Bureau of Reclamation

Vol. 15

FEBRUARY, 1924

No. 2

SPECIAL ADVISORS HEAR WATER USERS IN SALT LAKE CITY.

Committee goes to central point in West and invites delegations and individual farmers from each of the Government projects to appear and give information of conditions.

TRANSFERRING its seat of inquiry into Government reclamation from the National Capital to Salt Lake City, Utah, a central point within easy reach of all irrigation projects, the Special Advisory Committee is conducting a series of public hearings there.

Delegations and representatives of water users from the various Government projects are appearing before the committee as a result of special requests sent out broadcast to the project managers inviting water users to come to Salt Lake City and give first hand evidence.

Original plans of the members of the Special Advisory Committee to visit the reclamation projects and make a personal investigation of them had to be changed because of the necessity of making a final report in the immediate future. By its early completion it is hoped that some legislative action may be taken by Congress at the present session to bring about a readjustment of the entire governmental policy of reclaiming arid and semiarid lands of the West.

The conference between the Special Advisors and representatives of water users' associations as well as individual water users is being held at the Hotel Utah where direct information regarding

MANY WATER USERS PRESENT AT HEARING

TREMENDOUS interest was displayed and valuable testimony was presented at the Salt Lake City hearings of the Special Advisory Committee, which began sessions there on January 18.

Delegates of water users and farmers were present from every one of the Government irrigation projects with the exception of the Williston in North Dakota.

The number of representatives of various water users' associations, districts, and farmers' organizations attending the hearings totaled 175 on the first day of the session, with an additional number arriving at later dates.

Hearings of the Special Advisory Committee at Salt Lake City were open to the public, and stenographic reports were being made, so that the facts presented by the water users concerning conditions existing on their projects will become a permanent part of the official records of the Government.

conditions existing on each project and suggestions for amelioration of difficulties are being presented. Ample time is being given the farmers and representatives present to present arguments for readjustments as no time limit has been set by the Special Advisory Committee in holding the hearings. Practically the entire membership of the committee is at Salt Lake City, including former Gov. Thomas E. Campbell of Arizona, chairman; Dr. John A. Widtsoe, secretary; former Secretary of the Interior James R. Garfield, Dr. Elwood Mead, Hon. Oscar E. Bradfute, and Hon. Clyde E. Dawson.

Upon the conclusion of the meeting with the water users at Salt Lake City the Special Advisors on Reclamation will return to Washington and hasten the preparation of their report so that it may be submitted to the Secretary of the Interior and to the President and later transmitted to Congress.

favorable recommendation on the Phipps bill was made in order to protect many water users on the projects from the loss of their homes.

Secretary Work further represents in indorsing the bill that temporary relief should be given the farmers in meritorious instances because the costs of many projects have exceeded the amounts originally estimated, because of the inability of farmers to market their crops, and because of high freight rates, crop failures, and other causes. He points out that the irrigation season in 1924 will open within less than two months and early action is necessary.

The proposed measure also is designed to bridge over the existing hiatus before the Special Advisory Committee on Reclamation makes its report, which will be presented to Congress with recommendations for a new policy of reclamation based on sound business principles.

SECRETARY INDORSES EXTENSION MEASURE

Secretary of the Interior Work has recommended to the Senate Committee on Irrigation and Reclamation the enactment into law of a bill introduced by Senator Phipps, of Colorado, authorizing extension of time on payment of construction, operation, and maintenance charges and water charges on Government reclamation projects.

The proposed measure invests in the Secretary of the Interior authority to

defer the dates of such payments that have accrued or may accrue up to January 1, 1925, and provides that the amounts of deferred payments shall bear a 6 per cent rate of interest instead of the regular penalty of 1 per cent per month.

At the present time the Secretary of the Interior does not have legal authority to make extensions or suspensions of payments for the calendar year, and a

PICTORIAL LESSONS IN PRACTICAL IRRIGATION.

LESSON No. 2.



FIG. 1.—Irrigation of an orange grove on the Salt River project, Arizona.

THE development and activity of the root system determine the growth and welfare of the tree. Roots obtain water and indispensable plant food from the soils, and tend to seek out the places where these substances are most easily available. In such easy feeding grounds the largest root development occurs. The tree prospers best when the root system is large and feeding may also be large. It must be the concern of the farmer therefore to secure a large, widely distributed root system for his orchard trees. This may be accomplished in part by a wise system of irrigation. When the tree is young, the furrows should be near the tree as in Figure 2, so that there may be a full root development near the trunk. As the tree grows older the irrigation furrows should be moved farther away from the tree, as in Figure 1.

The roots will follow the water supply and a larger and more complete root system will result. From the furrows, as the water soaks downward, the water spreads, until 2 or 3 feet below the surface the soil is wholly moistened. Enough water should be applied at each irrigation to moisten the soil several feet deep, and

thereby to encourage the roots to forage for plant food in the lower soil layers. Frequent, heavy applications of water

tend to develop tree roots near the surface, and consequently to reduce the feeding area of the tree.



FIG. 2.—Irrigating fruit trees in an orchard on the Yakima project, Washington.

NO SENTIMENT AMONG FARMERS TO REPUDIATE DEBTS.

Salient fact developed by many months of investigation of Government reclamation shows that settlers and water users are imbued with spirit of integrity and patriotism.

WHAT has been the salient fact developed in the far-reaching and comprehensive investigation made of Government reclamation during the past six months?

It is this.

The farmers and settlers on every one of the 24 projects now in operation are imbued with a spirit of patriotism and integrity and a high sense of duty in repaying their obligations to the Government.

There is no organized effort at repudiation.

There is no individual effort at repudiation.

There is no openly expressed desire on the part of the water users to avoid paying the money due either for the cost of construction or the operation and maintenance of the various projects.

On the contrary there exists almost universally on all the projects a whole-hearted wish to cooperate willingly with the Government to the fullest extent in making reclamation a success.

Another salient fact revealed by the investigation is that the interests of the farmers have been almost wholly neglected in the past. Agriculture, the

principal and only source from which the Government is to obtain its money to cover costs of construction, has been held of secondary consequence in the general policy of reclaiming semiarid and arid lands.

In the future, if reclamation is to succeed, the Government will have to adopt an entirely new attitude and new method in handling the projects.

The farmers must be given first consideration.

They must be taught intensive cultivation of their small farms.

They must be instructed in the proper mode of irrigating and using water.

They must be apprised of the proper products to raise compatible with the soil and climate of their particular projects.

They must be warned against growing crops for which no market will be available after their harvest and for which the freight rates are prohibitive to consuming centers.

They must be assisted in diversifying their crops, in marketing them so that they may receive a satisfactory compensation for their toil.

They must be helped by the Government so that the settlers shall be able to make sufficient money annually to return the money due the Government both for operating, maintaining, and constructing each project.

The farms must be electrified.

Electric energy must be furnished each farm not only to run the agricultural equipment but to operate the washing machine and other household utensils in order to lessen the drudgery of the housewives.

The projects must be humanized by the formation of social centers in the schools and churches so that homes will be established where genuine contentment may exist.

The outstanding problem, therefore, is a simple one. Reclamation in the future must be conducted for the farmers. Their interests must be placed foremost above every other feature, for it is for them that the Government constructed the irrigation projects in the beginning and it is to them that the Government looks for the return of the millions of dollars that have been invested.

DAIRY PRODUCTS TOTAL \$500,000 FROM PROJECT

A recent survey shows that nearly \$500,000 has been paid to the farmers on the Minidoka project, Idaho, during the past year for dairy products shipped out, according to County Agent J. H. Barber. In addition, the project towns have been supplied with milk and a large percentage of their butter. Approximately half the dairy products shipped are marketed through the five cheese factories and the remainder through the cream stations. The cheese factories in December were paying a little over \$600 per day to the farmers.

Total figures on the egg production on the project are not available, but a few individual cases will serve to show what the hen is doing for the community. Haslett B. Leigh, who keeps an exact record on all items of cost and income on his flock of 200 pullets and 60 hens, made a profit of \$90 over and above all feed costs during November; and T. G. Gummerson, with a flock of 250 pullets and 175 hens, made a profit of \$132 above feed costs.

The cow and the hen are aiding materi-

\$75 PER ACRE PROFIT UPON COLORADO BEETS

On the western slope in Colorado, covering both the Uncompahgre and Grand River Valley irrigation projects, the average yield of beets in 1923 was 12 tons to the acre. Based on last year's final settlement price of \$10.55 a ton, the money returned this year would exceed \$125 per acre, gross. The actual cost of producing beets, if all labor is hired and contracted, is about \$50 an acre. This leaves a net profit of \$75 an acre to pay taxes, etc.

It should be explained that in growing beets it is necessary to rotate with alfalfa, potatoes, and grain, which would undoubtedly result in a lower net profit per acre; but one-third of the farm can be planted to beets each year, but the crop yield following beets is increased 50 per cent because of the intensive cultivation necessary in beet farming.

ally in putting this project back on the map as a progressive farming district.

UNCOMPAHGRE FARMER BOOSTS SUGAR BEETS

Mr. R. E. Henderson is farming with his brother 1 mile west of Delta, on the California mesa, Uncompahgre project, Colorado. At the close of the year he made the following statement, according to the Montrose Daily Press:

"I have raised 500 tons of sugar beets this year, and from present indications I will get several thousand dollars for the crop. This will clean up the debts I have accumulated for the past three years and leave a nice little nest egg besides. Next year we propose to put in a lot more beets and we shall be in a position then to make a lot more money. We have found that the way to handle farms in this valley is to put the most of your eggs in the sugar beet basket. It is by far the safest crop and the one that pays you the real cash."

Mr. Henderson leaves the beet tops in the field and uses them for pasturing his stock, which fertilizes the soil again. This he considers worth at least \$5 a ton for feeding purposes. He then purchases the pulp back from the factory at 50 cents per ton and feeds this to his dairy stock. This he considers better than expensive hay.

HOLSTEIN BULLS LOANED BY HUNTLEY TO SHOSHONE.

Two groups of water users on the Shoshone irrigation project obtain purebred bulls from the experiment farm on the Huntley irrigation project, which are expected to aid materially in building up the dairy industry on the project.



Holstein bulls to be used in building up the dairy industry on the Shoshone project, Wyo.

IN November, 1923, the Huntley Experiment Farm, Montana, placed two yearling purebred Holstein bulls on the Shoshone project, Wyoming. One was assigned to Messrs. T. T. Williams, R. G. Anderson, Elmer Gould, and J. E. McPherson; and the other to J. L. Werts & Son, R. B. Stetler, Earl Murray, and E. V. Lewis.

In arranging for the use of these bulls each group of farmers contracted with the chief of the dairy division of the Bureau of Animal Industry of the Department of Agriculture and agreed to the following conditions:

1. To feed and care for the bull at their own expense, to mate the bull with only such members of the herd as shall be agreed upon by the farmers and the Department of Agriculture, and to mate the bull with outside animals only upon obtaining permission from the Department of Agriculture.

2. To keep the herd free from tuberculosis by having animals tested yearly by the Bureau of Animal Industry and by promptly removing or isolating all animals which react to the test.

3. To keep accurate milk records of all cows with which the bull is mated, to test the milk of each such mated cow monthly for butterfat, and to keep accurate records as to the dates of breeding and calving.

4. To retain all heifers in the herd until they have finished at least one lactation period unless the disposal of heifer otherwise is approved by the Department of Agriculture.

5. To keep accurate milk records of all daughters of the bull and to test the milk of each daughter monthly for butterfat.

6. To permit the Department of Agriculture, at any and all times, to inspect all breeding and production records kept by the members of each group.

7. To feed the bull properly, to use the highest degree of care in caring for the bull, and to return the bull to the Department of Agriculture at the termination of the agreement in as good condition as when obtained.

In addition it is understood between the farmers and the Department of Agriculture:

1. That the bull shall remain the property of the Department of Agriculture and shall be subject to removal upon one day's notice, in case the department considers that the objects of the work to be accomplished under the arrangement are not being attained or upon failure of the farmers to whom the bull is assigned, to fulfill the conditions of the agreement.

2. That all expenses for veterinary services necessary while the bull is in the custody of the groups of farmers shall be paid by them.

This policy of the Bureau of Animal Industry to loan purebred bulls to various groups of farmers is a part of the breeding project of that bureau to test out the ability of the purebred bulls loaned to sire daughters of superior merit as producers of milk and butterfat.

The obtaining of these purebred bulls is a matter of much interest and importance to the Shoshone project and indicates the tendency among those engaged in the dairy industry to obtain purebred stock and to increase production. Already there have been applications made to

obtain similar animals for other groups of farmers.

The first group of men mentioned have arranged to have T. T. Williams care for the bull assigned to them and the expenses are to be shared among them on the basis of the stock to be served. Williams lives 1 mile south of Powell and the other members of his group live in the immediate vicinity. The stock to be served in this group, including cows and heifers, is as follows: T. T. Williams, 5 head; R. G. Anderson, 5; Dr. Elmer Gould, 6; J. E. McPherson, 6; total, 22 head.

J. L. Werts & Son have been chosen to keep the second bull obtained, with expenses to be handled under the same plan as mentioned for the first group. Mr. Werts lives 3½ miles east of Powell and the other members of the group are residents of the same community. Mr. Werts keeps 20 head of cows and heifers and has always been one of the leading dairymen on the project. He manufactures his own butter and sells it in and around Powell. He is equipped with an electric milking machine and owing to the fact that the natural-gas pipe line leading from the Byron field to Powell passes through his farm, he has natural gas available for running his gas engines, operating the generator for the electric milker, cream separator and churn, and also for furnishing heat for sterilizing bottles, etc. Werts has always been interested in purebred stock and in boosting dairying and its advantages. The stock to be served in this group is as follows: J. L. Werts & Son, 20 head; R. B. Stetler, 5; Earl Murray, 4; E. V. Lewis, 3; total, 32 head.

A SILO OF ONE FORM OR ANOTHER IS A FARM NECESSITY

Many farmers will find that the construction of a pit silo will solve the problem of cost, where conditions are favorable—Its advantages, disadvantages, and details of construction.

WHERE the soil formation will permit and where the underground water is not too close to the surface, the pit silo is a very practical type to construct, says Bulletin 288, recently issued by the Experiment Station of the Colorado Agricultural College. The following information concerning this type of silo is found in the bulletin.

The pit silo has some advantages over other types in that this type costs less to construct; there is no trouble from feeding frozen ensilage; and less power is required in operating the ensilage cutter, because it is not necessary to raise the ensilage to any considerable height.

On the other hand the pit silo can not be constructed economically in regions where the soil has a tendency to cave in. If the soil will not remain in an upright position, it will be necessary to construct a heavy retaining wall, and this will require almost as much material as building a silo above ground. The ensilage is more difficult to remove from the pit silo than from the above-ground type, although this objection can be largely overcome by constructing a good hoisting derrick. Another objection is the danger of the formation of the poisonous carbon dioxide gas on the surface of the ensilage at filling time. This gas continues to form for ten days or two weeks, after which time very little is formed. No one should enter the pit at filling time, until after the ensilage cutter has been operated a few minutes. The falling ensilage will drive out the gas from the bottom of the silo.

After a desirable location has been decided upon, the ground should be marked off. A simple device for this purpose can be constructed from a piece of 2 by 4 about 15 inches longer than one-half the diameter of the silo. In one end, bore a hole and fasten by means of a spike or bolt to a stake driven in the ground where the center of the silo will come. Lay off and mark on this piece a distance equal to one-half the diameter of the silo. Nail a marker of 1-inch material to the 2 by 4 at this point. Another marker should be placed at a distance of 6 inches from the first. Draw the circles and dig a trench between them as deep as can be conveniently dug with a spade. A tiling spade will be better for this purpose than an ordinary spade. Care should be taken to keep the inside wall smooth.

The trench is then filled with concrete. A good mixture for this purpose is 1 part

of cement, 2½ parts of sand, and 5 parts of gravel. If bank-run gravel is used, 1 part of cement and 5 parts of bank-run gravel are equivalent to the above mixture. The purpose of this wall is to prevent the surface soil from caving in.

TEN GOOD REASONS FOR THE ROTATION OF CROPS

W. L. Powers and C. V. Ruzek in "Crop Rotation and Soil Fertility," give the following reasons for crop rotation:

1. The greatest benefit from crop rotation comes from the humus and nitrogen gained from plowing under legume sod and crop residues.

2. Crop rotation makes possible a diversity of crops with steady output.

3. Crop rotation affords steady employment, the work being more evenly distributed.

4. Crop rotation helps to eradicate weeds and to avoid insect pests, plant diseases, and toxins.

5. Crop rotation conserves fertility through the different demands of the root systems of different crops and by allowing recuperation after crops which make heavy demands on the soil.

6. Crop rotation helps improve tilth and available fertility by permitting plowing in of sod, use of deep-rooted legumes, crop residues, and barnyard manure, and pasturing with farm animals.

7. Under irrigation, upkeep of water capacity and available fertility are important in lessening the irrigation requirement.

8. One-crop farmers all need water at once, whereas a diversity of crops in a neighborhood permits distribution in time of use of irrigation water.

9. Rotation permits use each year of some cultivated cash crops of low water requirement which give large returns per unit of land and water.

10. Crop rotation keeps the land occupied, systematizes farming, and results in larger yields and profits.

It is well to extend this wall 3 feet above the ground to prevent the danger of stock falling into the silo. The above-ground portion should be constructed before much excavating is done. The walls can be made of concrete or "adobe."

If concrete is used, it should be of the same mixture as the retaining wall, but it is well to reinforce it with some good woven-wire fencing. The forms can be made of battens nailed to pieces of 2 by 4 driven into the ground every 2 or 3 feet. If "adobe" is used, the walls above the ground should be 10 or 12 inches thick and plastered inside and outside with cement plaster.

After the concrete in the retaining wall has set properly, the soil should be removed to a depth of 5 or 6 feet below the retaining wall, care being taken to keep the wall smooth and plumb. After the dirt has been removed, the walls should be given two or three coats of cement plaster, made by mixing 1 part of cement and 2 parts of clean sand. The sand and cement should be mixed thoroughly, then enough water added to make a good mortar. The coats of plaster can be put on as separate coats, or else plaster 4 or 5 yards, and then go over it with a second coat before it has time to set. If the dirt wall is dry, it should be moistened with water in order to make the mortar stick to the walls better and to prevent the soil from absorbing the moisture from the plaster too rapidly. The plastered wall should be kept moist for several days while setting. After the plaster has set, it should be given a coat of cement wash, made by mixing 1 part of cement and 1 part of fine sand to a creamy consistency. Another 5 or 6 feet of dirt is then removed, and the walls plastered, as described above. This process is continued until the desired depth is reached. The bottom of the pit should not be plastered, as a dirt bottom is more desirable than concrete.

The size of silo to construct depends upon the number of cattle to be fed and upon the length of the feeding season. In order to keep the ensilage fresh after feeding has begun, a depth of at least 2 inches should be removed daily. The diameter, therefore, depends upon the amount of the ensilage to be fed each day.

More than two billion dollars of business was done by farmer business organizations in 1923. Of the organizations reporting, about 90 per cent were primarily engaged in selling farm products and about 10 per cent in the collective purchasing of farm supplies.

THE PROBLEM OF ELECTRIC SERVICE FOR AGRICULTURE.

First question to be solved is the source of the current and second is the manner in which it can be used to relieve the burdens of the housewives and furnish power for farm equipment.

By Dr. E. E. White, Director, Committee on the Relation of Electricity to Agriculture.

WHAT is electricity going to do for the farmer? With every indication that this nation is entering what is popularly called an electrical age it is none too soon to give comprehensive consideration to the above question. Great developments do not just happen. Back of the scenes there is always some man or woman with vision and the ability to make other people appreciate this vision. There must be belief before there is action; planning, experimenting, searching for the maximum follow as a natural result. With our great wealth of natural resources possibilities are limited essentially by our initiative and vision.

Above everything else we are building a civilization and it is unthinkable that we shall ever have maximum agricultural or national development without electric service on the farm. To date, electrical developments have been essentially urban in character. Among other things this has brought a new standard of living to city dwellers and has been a dominant factor in lightening the burden of the city housewife. The farmer, his wife and family are entitled to these same conveniences and a standard of living comparable to city families of the same economic standing. Certainly we are not going to be satisfied with a condition which makes it possible for the laboring

man in town to have better conveniences in his home than the farmer has. Now, the desired goal can not be reached by lowering the standards in the city. We must look for progress in the other direction. Elevating the standard of living on the farm is the thing and electric service will go a long way toward solving this problem and make possible for the farmer's wife labor-saving equipment indoors comparable to the modern machinery used in the fields.

There are no insurmountable engineering difficulties in the path of electric service for the farm. It is essentially an economic problem, one of finding what are the maximum uses for this service in the rural field. The farmer uses a large amount of power. For just how much of this work electricity can profitably be used is not known but there is every reason why we should find out. There are two problems connected with this. The first, where we are going to get the electric current from, which involves the relation between hydro and steam plants and the second the utilization of this current on the farm. As the art of generating and distributing current is far in advance of the art of using it on the farm the first step may well be an investigation to throw light on utilization. Once the economic opportunities for the use of

electricity in agriculture are established attention can profitably be paid to the source from which this service may be obtained and how it should be distributed to keep the costs down.

We are faced with all the problems of taking a new form of power to the largest single industry in this country. We are venturing into a new field where the possibilities stimulate the imagination. What the probabilities are is for the future to reveal. It is a field for the original thinker, the pioneer, the men who can get a perspective of the entire problem and at the same time keep their feet on sound economic and engineering ground. To get all the facts is too big a problem for the individual farmer or a group of farmers. It requires organized investigation. It is a problem of sufficient importance to attract organizations which have a direct interest in the future of American agriculture. In this connection it is a pleasure to report that the Department of Interior is represented on the Committee on the Relation of Electricity to Agriculture. It is the purpose of this organization to give purpose and direction to the work; collect, digest, and distribute pertinent information; stimulate investigations and see that reliable facts are made available to the public.

CAUSE OF RECLAMATION FAILURES

(Editorial from Portland Oregonian.)

THE explanation offered by A. P. Davis for increase in cost of reclamation projects over estimates during the period when he was chief of the reclamation bureau will certainly not be satisfactory to the settler, who is called upon to repay that cost. An acre of irrigated land in a certain location can yield so much money in crops and can carry a certain charge for reclamation. If through change of plan by the Government, cost of construction is increased beyond that estimate or if through failure to plant settlers on all the land, the irrigated acreage has to pay annual charges for a large unirrigated acreage, the settler is injured, perhaps ruined, and the Government is responsible.

Mr. Davis's excuse shows his mind to be on the engineering, construction end

of the work to the exclusion of the settlement and production end. Reclamation is a big business proposition, which consists in making salable and then selling public land that is worthless in its natural state. A tract should only be reclaimed from that viewpoint if the cost can be held within the amount on which the land will repay construction cost, pay annual charges, and provide a living for the farmer. No increase of cost is justified unless it is within that figure. The operation is only begun when water is put on the land. The next step is to sell the land to the type of man that can successfully farm it, and to sell all of it, for if the Government sells only half of a tract, that half must bear double charges or the Government must pay charges on the unsold part until it is sold. Then the Government should give all

the information necessary to enable the settler to select the best crop and to make his farm a success. Not until then is the business operation completed, for in no other way can the Government recoup its expenditure.

Failures in Government reclamation are chiefly due to neglect of the land-selling character of the undertaking. If that were kept in mind from the outset, a project would be abandoned rather than constructed at a cost beyond the capacity of the land to repay. Construction would no sooner be well advanced than a selling campaign would be opened, and selling would be selective with a view of finding settlers who would succeed and would be continued until practically all the land in a tract was sold. This requires that the sales agent and the agricultural agent should closely follow the engineer, and it would not be amiss if an organizer of cooperative marketing associations should come in their train.

GOVERNMENT WINS SUIT CONCERNING SEEPAGE WATER

The United States Supreme Court supports claim of Bureau of Reclamation that it may recapture and use waste and seepage water arising on Federal irrigation projects.

IN connection with the development of the Shoshone Federal irrigation project in Wyoming, the United States has long claimed the right to recapture and use waste and seepage water arising from the project and flowing in a natural ravine called Bitter Creek. To utilize this water it became necessary to make certain excavations, to which objection was made by Arthur W. Ide and others, who contended that the Government had no right of way across their lands for this construction work, and, furthermore, that they, instead of the United States, were entitled to the use of the seepage water. The Government brought suit to enjoin threatened interference with its construction program. The United States district court entered a decree for the defendants. In the circuit court of appeals this decree was reversed (*United States v. Ide et al.*, 277 Fed. 373). The defendants appealed to the United States Supreme Court, and on January 7, 1924, that court affirmed the decree of the circuit court of appeals. It held that the Government had a right of way across the lands of the defendants under the act of August 30, 1890 (26 Stat. 391), and that it was entitled to utilize the seepage waters in question. Upon the latter point we quote from the opinion of the court, which was delivered by Mr. Justice Van Devanter:

The seepage producing the artificial flow is part of the water which the plaintiff, in virtue of its appropriation, takes from the Shoshone River and conducts to the project lands in the vicinity of the ravine for use in their irrigation. The defendants insist that when water is once used under the appropriation it can not be used again—that the right to use it is exhausted. But we perceive no ground for thinking the appropriation is thus restricted. According to the record it is intended to cover, and does cover, the reclamation and cultivation of all the lands within the project. A second use in accomplishing that object is as much within the scope of the appropriation as a first use is. The State law and the national reclamation act both contemplate that the water shall be so conserved that it may be subjected to the largest practicable use. A further contention is that the plaintiff sells the water before it is used, and therefore has no right in the seepage. But the water is not sold. In disposing of the lands in small parcels, the plaintiff invests each purchaser with a right to have enough water supplied from the project canals to irrigate his land, but it does not give up all control over the water or do more than pass to the purchaser a right to use the water so far as may be necessary in properly cultivating his land. Beyond this all rights incident to the appropriation are retained by the plaintiff. Its right in the seepage is well illustrated by the following excerpt from

the opinion of District Judge Dietrich in *United States v. Haga* (276 Fed. 41, 43):

One who by the expenditure of money and labor diverts appropriate water from a stream, and thus makes it available for fruitful purposes, is entitled to its exclusive control so long as he is able and willing to apply it to beneficial uses, and such right extends to what is commonly known as wastage from surface run-off and deep percolation, necessarily incident to practical irrigation. Considerations of both public policy and natural justice strongly support such a rule. Nor is it essential to his control that the appropriator maintain continuous actual possession of such water. So long as he does not abandon it or forfeit it by failure to use, he may assert his rights. It is not necessary that he confine it upon his own land or convey it in an artificial conduit. It is requisite, of course, that he be able to identify it; but, subject to that limitation, he may conduct it through natural channels and may even commingle it or suffer it to commingle with other waters. In short, the rights of an appropriator in these respects are not affected by the fact that the water has once been used.

An instructive application of this rule is found in *McKelvey v. North Sterling Irrigation District* (66 Colo. 11).

Measures for collecting and using the seepage could not well be taken in advance of its appearance. When it began to appear in appreciable quantity the plaintiff's officers took up the formulation of plans for utilizing it. The matter was much considered, for like problems were arising in connection with other projects. The advice of Army engineers was sought; plans were recommended and adopted; necessary expenditures were authorized, and the work was then undertaken. That on the ravine was begun in 1914. At no

time was there any purpose to abandon the seepage. On the contrary, the plaintiff needed and intended to use all of it for project purposes. This was stated and restated in various official reports, including some by the Director of the Reclamation Service and the Secretary of the Interior, and was well understood by the project officers. In these circumstances it is very plain that the plaintiff's right in the seepage was not abandoned.

As making against this conclusion, the defendants say that the plaintiff in 1910 applied to the State engineer for a permit authorizing it to divert water from the ravine for the irrigation of particular lands and that the application was returned without approval. But we find no evidence of abandonment in this. If the application shows anything material in this connection, it is that the plaintiff was then intending to divert and use the seepage. The reason given by the State engineer for returning the application without approval was that the irrigation of the particular lands was "already covered" by the plaintiff's existing permit. Certainly nothing was lost by the application or by the engineer's action thereon.

The appropriations from the ravine which are asserted by some of the defendants were made under permits issued by the State engineer in 1910 and 1915, and this is advanced as a reason for sustaining them. The permits were based on ex parte applications and were mere licenses to appropriate in accordance with the law of the State, if the water was available. *Wyoming v. Colorado* (259 U. S. 419, 488). We have seen that under the law of the State the natural flow could not be appropriated, because the conditions did not admit of its beneficial use, and that the artificial flow was not available because the plaintiff was entitled and intending to use it. The asserted appropriations therefore derive no support from the permits.

DRAFT RESOLUTIONS UPON NEW PROJECTS

The Sunnyside Valley Irrigation District of the Yakima project has drafted the following resolutions:

"Whereas the farmers of Sunnyside project are owing \$100,000 delinquent irrigation assessments and over a million dollars in delinquent taxes.

"Whereas, the prosperity of the farmers already upon the land is of paramount importance and the welfare of those who might be benefited by a further increase of farming land is of secondary consideration: Therefore be it

"Resolved by the water users of the Sunnyside Valley Irrigation District, That we are opposed to any extension of its activities in reclaiming arid lands and we respectfully urge upon the reclamation department that it undertake no new irrigation project until conditions show a need for such construction, and that the owners of land in this project be granted an extension of time in which to pay the water charges against their land.

"And that a copy of this resolution be sent to each of our Senators and to our Congressmen."—Copied from *The Sunnyside Sun*, December 13, 1923.

IRRIGATION DISTRICT SUBJECT OF HEARING

A hearing for the purpose of readjusting the financial affairs of the Farmers' Irrigation District in Nebraska has been set at the Interior Department for February 5.

The Farmers' Irrigation District is a private enterprise located within the area of the North Platte Government reclamation project that has been receiving water from the storage reservoir created by the Pathfinder Dam.

The water users have proposed that the Interior Department take over the entire management and operation of the district, making it a part of the North Platte project.

A general readjustment of its financial affairs is also proposed, all of which will be presented at the hearing.

NOTES FROM RECLAMATION PROJECTS

The Paul sugar factory on the Minidoka project closed its operation on December 12 after a most successful season's run. More beets were sliced than in any preceding season in the history of the factory. In 1920, 36,105 tons of beets were sliced; in 1921, 36,615; and in 1923, 70,000 (estimated). The increased yield has been attributed by field experts to improved farming methods. About 3,500 cattle and 20,000 sheep are being fed on the by-products this season.

Having packed and shipped 19 cars of oranges for the season, the packing house at Orland on the Orland project, Calif., discontinued operations on December 12. Shipments of oranges for the season from Orland totaled 24 cars.

An advance estimate of cotton production on the Rio Grande project is 25,000 bales, bringing the total value of lint and seed close to \$5,000,000.

Collections for the month of November on the Strawberry Valley project amounted to \$41,419.12, compared with \$34,552.51 for the same month in 1922. The total collections on this project for the period January 1 to December 1,

1923, amounted to \$141,095.65, compared with \$116,320.69 for the same period in 1922.

THIS GOBBLER PAID

Mrs. W. H. Edley, Shoshone project, had a flock of Giant Bronze turkeys last fall which demonstrated forcibly the value of purebred stock. One of her turkey toms was sold to the county agent for \$25, the agent making the purchase to keep the bird in the county, for there were many offers for the big tom from outside points. Mrs. Edley will ship in a \$50 male bird to head this season's flock.

The total sugar-beet production in 1923 on the Lower Yellowstone project was about 33,000 tons from 3,200 acres, or an average yield of 10.3 tons per acre.

Advance figures for the 1923 crop report on the Lower Yellowstone project indicate an average value of about \$28 per acre as compared with \$21.68 in 1922.

Montana presents a prosperity proclamation—the greatest production in its history for 1923. The total value of

agricultural production and livestock and livestock products is reported at \$176,515,000. The Huntley, Milk River, Sun River, and Lower Yellowstone projects lie wholly or in part in Montana, not to mention the three Indian projects, Blackfeet, Flathead, and Fort Peck.

It is reported that the 1923 fruit crop of the Yakima Valley will total more than 23,000 cars, 6,000 cars in excess of the 1921 crop, which was the banner yield for tonnage before the present crop was grown and harvested.

Yakima County's 1923 crop and factory product represents a total value of \$36,696,000, according to estimates made by the Yakima Herald. This represents a gain of \$8,000,000 over the total of the 1922 production.

More than 100 tons of turkeys were shipped from the Orland project for the Thanksgiving, Christmas, and New Year markets. The total amount of money paid into the community through the sale of turkeys is not far from \$60,000.

It takes planning, it takes headwork, it takes family teamwork the year round to make farming a good business and the farm a good home.



The irrigation projects support thousands of hives of bees which store up tons of sweetness from the vast field of alfalfa and clover.

MILK RIVER RESOLUTIONS

THE following resolutions have been adopted by the Lower Milk River Water Users' Association of Montana and forwarded to the Secretary of the Interior:

"Whereas, the cost to properly irrigate the lands of the Milk River Valley as estimated by local reclamation officials is over 350 per cent more than the original estimate made when the work was started, and

"Whereas, these excessive costs have been incurred by the different project managers and reclamation officers who are technical rather than practical, now, therefore, be it

"Resolved, By the Lower Milk River water users and the stockholders of the

same, at their meeting held in Malta this 12th day of January, 1924, that they most earnestly recommend to the Secretary of the Interior that the operating and engineering features of the project be divorced from each other; be it

"Further resolved, That the project manager should be a practical man of known ability, with authority to conduct the affairs of the project with and by the approval of the commissioners of the irrigation district, and where no irrigation districts are operating, by the approval by the Water Users' Association, and that the engineering be performed under and by direction of the project manager.

"Whereas, the Reclamation Service through their former officers have incurred heavy additional costs over and above the original estimates when the work was first started and the exorbitant costs have practically bankrupted the landowners under the various projects; now, therefore, be it

"Resolved, That the Lower Milk River Water Users' Association at their meeting at Malta January 12, 1924, most heartily indorse the action of Secretary of the Interior Work in appointing a practical man with experience in irrigation matters; be it

"Further resolved, That copies of this resolution be sent to the Secretary of the Interior, to the Bureau of Reclamation, Washington, D. C., and to the project manager at Malta, Mont.

JOHN SURVANT, President.

T. J. SARSON, Secretary.

COLORADO STORAGE ENGINEERS SELECTED

A committee composed of five engineers, four of whom are in the service of the Government and the fifth an outside engineer, is being organized by Secretary of the Interior Work for the purpose of advising on a definite plan for the control of floods on the Colorado River, the development of its water power and the storage of water for irrigation of arid lands in the lower Colorado River Basin.

The proposed personnel of the committee includes a representative of the War Department, a representative of the Reclamation Bureau, a representative of the Geological Survey, and a representative of the Federal Power Commission, and another engineer, providing he can be found, not connected with the Government. Secretary Work to-day appointed F. E. Weymouth, chief engineer of the Reclamation Bureau, to serve on the committee as a representative of the Reclamation Bureau. Herman Stabler was named to represent the Geological Survey, and Col. William Kelly to represent the Federal Power Commission. The Secretary of War has been invited to appoint an engineer to represent the War Department. In explaining his request for the services of such a committee, Secretary Work said:

"The control of the floods in the Colorado River, the development of water power, and the storage of water for irrigation of arid lands in the lower Colorado River Basin have, under authority of Congress, been the subject of investigation for the past two years or more and

various bills have been introduced in Congress proposing to authorize the construction of a dam, or dams, in the Colorado River for this purpose. A considerable amount of engineering, water resources, and other data have been collected in the field by engineers of the Reclamation Service and others, and is available.

"As an aid in my future action in the matter I desire to obtain the benefit of the advice of some especially qualified men who can review and collate the data already gathered and furnish in abstract form the net results of investigations and their views and recommendations in the matter. It is not contemplated that field investigations will be made by this committee."

COMMISSIONER DAVIS RETURNS TO DESK

Hon. David W. Davis, Commissioner of the Bureau of Reclamation, has returned to Washington from Hot Springs, Ark., where he underwent a course of medical treatment.

Commissioner Davis has been indisposed for the last two months, but on account of pressing duties as head of the Reclamation Bureau he has remained at his desk.

After a series of examinations by his physicians, he was ordered by them to go to Hot Springs for treatment, where he remained ten days.



The tortuous course of the High Line Canal on the Strawberry Valley project, Utah.

FEBRUARY POULTRY PROBLEMS

"THE shortest month of the year often offers many real hardships, and antagonizes successful poultry culture, by reason of its precarious weather," says H. O. Numbers, secretary of the Pennsylvania State Poultry Association. "If the matured stock have escaped the ravages of colds, roup, and kindred diseases up to this time, it will be well to exert precaution now. The farmer during the beginning of the winter months is on the alert for sudden changes of temperatures, and usually renders devotion to his hens that they may produce eggs at high prices. But as the season progresses he sometimes takes too much for granted, and becomes a little careless. He is like a man with a new car; at first he applies himself untiringly to its care, but as the novelty wears off he invariably permits neglect to be the master. Just so with the winter care of chickens. It sometimes requires a disease or some other distress to enter one's flock in order to rouse him to the importance of eternal vigilance. February provides us with a mixture of weather. We may have our houses regulated for a temperature like unto spring, and during the night it may 'blow up' and the morning will find us in the throes of winter—then, vice versa, the result being the dreaded affliction of colds or roup.

"I recently had a man tell me that he had a dread of February. It meant sick chickens. He usually closed up his houses tight in order to keep the warmth in and the cold out. I showed him my scheme of ventilating. We never close our windows, but we do have our hens protected from drafts. Remember that a chicken will stand almost any amount of cold air, but a draft will show its effects at once. One hen with a cold will affect a whole flock in a few days' time. There are a lot of so-called remedies, but the best is prevention. A chicken once afflicted is never the same as before. You may work a temporary relief, but it will be susceptible to all bacteria afloat. Keep your birds in action. Have cheery quarters. Keep them comfortable. A monotonous diet is disliked by chickens as well as people. I do not mean that you should go to extremes in your feeding schedules, but vary the ration occasionally. For instance, on our farm we have fixed days that we feed a warm mash, another day we feed green cut bone, and another day we feed oats sprouts. The regular mash and scratch rations are not changed.

"I would like to talk to you briefly about incubators. This is the time when most everyone is either 'starting' his early hatches or is contemplating the purchase of a new incubator. All machines are advertised as 'the best,' but it will be well to note a few suggestions relative to the requirements of artificial incubation. Moisture properly supplied is an absolute essential. Last season I learned of a man who claimed that he could not get more than 10 per cent of a hatch. He blamed the eggs, he blamed his breeders, and countless other causes. Exactly four weeks ago he called on me, and asked how to run an incubator. After we had inquired the make of machine he had, I outlined the process. He said 'I see it all now, I took out my moisture pans on the 18th day.' No wonder he could not hatch. At the time he most required the moisture he removed it. He had not followed the instructions given by the manufacturers.

"The incubator must be placed in a room of even temperature, free from drafts. A farmer whom I visited had bought a new machine of recognized merit and placed it in an upstairs bedroom at a window. He complained of poor hatches. Another placed a good machine in a dirty, damp, musty cellar. Result, poor hatches. A well-ventilated cellar is the best place for most incubators. It is handy to operate, and the temperature does not fluctuate. Be sure that the machine sits perfectly level. The diffu-

sion of heat, or rather the circulation of heat, depends upon the correctness of placing the incubator. A spirit level is an essential tool around an incubator.

"I want to warn you against a lot of cheap machines advertised by some mail-order houses. I say this because I recently visited a large manufacturer of incubators, and he showed me a type of machine he was building, over the specifications of a mail-order house. The lumber was green and unseasoned—faulty heating system, in fact dangerous—and throughout the machine was anything but practical. Yet he had orders for thousands, building them under a trade name given by the mail-order house. I asked him if he was not afraid that his reputation might not be at stake. He replied 'that he was out for business, and no one knew that he built these machines.' His own brand holds an enviable place in the incubator industry. Buy an incubator that has been tried by others, and who will attest to its merits.

"If you have never operated an incubator and start this year, your first hatch may be a record breaker. They usually are for the beginner, as he follows the instructions to the letter. Don't get too cocksure of yourself at your first success. Keep right on following the instructions, and if you have a good machine, you will be surprised at your success. I can not emphasize too strongly the urgency of early hatches. These are the ones that bring the high broiler prices, and these pullets lay eggs early when you require them most—just about the time when your old hens begin to slack up and go into the molt. Of course some of your early pullets may go into a molt, but if you handle them properly most will escape and the others can be brought through rapidly. The best kind of breeders have been derived from pullets hatched early and permitted to molt. If we had space we could prove that from a financial point this is practicable.

"The World's Poultry Congress will convene in Spain this year. The month of May will find delegates from the United States representing the poultry industry to the world at that congress. We want to have something to represent. So, Mr. Farmer, will you cooperate, raise a lot, and raise the best. Mongrel flocks have no place in the well-paid markets. If you think you have a good flock, improve it. If you have 'just a few chickens' with no particular breed, you cheapen the outlook of the industry, and you are not a credit to progressive America."

HENS YIELD REVENUE ON UNCOMPAHGRE FARM

Ralph C. Nash, of Spring Creek Mesa, near Montrose, is just a farmer. He has a few cows, a flock of about 100 hens, raises a garden, and specializes on nothing. There are three in his family, all grown. In the 10 months from January 1 to November 1, 1923, the entire grocery bill for the family, including hired help during harvest, etc., was \$163.97. During the same period he sold eggs to the amount of \$211.75. One year he charged his hens with \$4 per hundredweight for all the grain they ate and realized a net return of \$1 per hen. Mr. Nash states that he has a credit balance at the grocery store where he trades, practically all the time, just from his eggs.

AGRICULTURAL PROGRAM FOR 1924

A NATIONAL agricultural program for the years 1924-25 should, according to Secretary Wallace of the Department of Agriculture, include at least the following subjects as requiring attention:

First, good farming with all that those words imply; the use of good seed, good cultural methods, good livestock, good care and feeding, economy of operation, and everything else that goes with really good farming.

Second, which is really included in the first, good farm management; wise selection of the crops to be grown, and of the livestock; adaptation to soil and climate; the best adjustment of acreage to conditions both on the farm and off; proper fitting of crops for market; and everything which ought to go with good farm management.

Third, making available to the farmer through Federal and State agencies information which he can not secure for himself but which he needs to enable him to produce efficiently and intelligently and to market to the best advantage. For example, knowledge concerning the control of plant and animal diseases and insect pests; conditions at home and

abroad which may influence demand for and prices of crops grown, such as probable production at home and in competing countries, business conditions, trade arrangements. In short, exactly the same kind of information the business man wants to know concerning probable markets for his products.

Fourth, how best to speed up the dissemination of knowledge concerning the new credit facilities provided by the Federal Government, not for the purpose of encouraging the farmer to go deeper in debt but to help him get out by securing lower interest rates for what he must borrow and by refunding his short term obligations for longer periods through which he may have a fair chance to work out.

Fifth, such reduction in freight rates as may be possible and still maintain good transportation service.

Sixth, how the Government might effectively help the farmer bridge over this period of stress, which would include consideration of the various suggestions for disposition of surplus over and above domestic requirements in such a way as to bring up the domestic price to more nearly its normal purchasing value.

SAN LUIS VALLEY DRAIN UNDER CONSIDERATION

Secretary of the Interior Work has authorized an allotment of \$5,000 from reclamation funds to be used in an engineering survey of the San Luis Valley of Colorado to determine the amount of water being used in the irrigation of some 370,000 acres of land and the amount that can be saved through the construction of a large trunk drain running through the valley.

Upon the collection of these data by the engineering corps of the Bureau of Reclamation a report will be made on the feasibility of the proposed drainage of the valley and the estimated cost of the drain and reservoirs for the storage of water for additional irrigation. Recently the States of Colorado and New Mexico passed laws authorizing the appointment of commissioners from each State to effect an agreement as to the division of the waters of the Rio Grande. Texas has also been invited to join in these negotiations. The data gathered by the Government in the investigation authorized by Secretary Work are expected to facilitate the settlement of the dispute over water rights.

Much of the land in the San Luis Valley has become water-logged, and the proposed drain, if constructed, will result in saving thousands of acres of land for future cultivation and in increasing the acreage irrigated through the storage of additional water.

BEETS PAY WATER USER

M. G. HINSHAW, a water user on the Grand Valley project, Colorado, when asked what he considered his best paying crop, stated without hesitation "sugar beets," and he owes his success largely to his habit of planting a certain acreage of this crop every year, which insures him a stable market. The accompanying table shows what sugar beets have brought him in revenue during the past four years:

Year.	Acreage.	Tonnage.		Money received from sugar company.
		Total.	Per acre.	
1919.....	22.25	293.3	13.2	\$3,695.17
1920.....	57.00	504.0	8.8	5,040.26
1921.....	41.00	805.6	20.0	5,179.70
1922.....	41.00	563.5	13.7	5,071.71
Total.	161.25	2,166.4	13.4	18,986.84

When questioned with regard to the disposal of his beet tops, Hinshaw stated that they made the "best fertilizer possible." The first year he sold the tops, but since then he has scattered them over the land where they grew and plowed them under in

the fall. Hinshaw is farming with his head as well as with his hands and feet.



Purebred cows handled properly increase the farmers' milk checks.

CROP CONDITIONS ON THE PROJECTS

THE following is a brief summary of crop conditions on the irrigation projects of the Department of the Interior, Bureau of Reclamation, at the end of December:

Yuma project, Arizona-California.—The first picking of cotton was practically completed by the middle of the month. Conditions were favorable for the maturing of late cotton and for the growth of alfalfa and winter truck. Some damage was done to alfalfa by rain.

Orland project, California.—Twenty-five carloads of oranges were shipped from the project, 19 of which were through the local growers' association. One car of lemons was shipped. The price of alfalfa rose from \$11.50 to \$16 per ton owing to continued dry weather. Shipments of Christmas and New Year's turkeys amounted to 72,000 pounds, exceeding the Thanksgiving shipments by 17,000 pounds. The price varied from 23 to 32 cents per pound.

Grand Valley project, Colorado.—No movement of crops was in progress except delivery of hay to local purchasers. The farmers as a whole were very much encouraged over the results of the season's operations and the feeling is distinctly optimistic.

Uncompahgre project, Colorado.—The movement of the potato crop was slow and much of the crop will be held over until spring. Results from the crop season of 1923 were encouraging, and it is estimated that the gross value of all crops will be approximately \$600,000 more than that received in 1922.

Boise project, Idaho.—About 80 per cent of the hay crop has been fed, and a considerable amount remained unsold. There was little outside demand for potatoes. Some apples were being shipped from local storage.

Minidoka project, Idaho.—About 142,000 tons of sugar beets were cut at the local factories and the amount paid to growers exceeded \$850,000. Officials of the sugar company estimate that bonuses bringing the average payment per ton to \$8 will be paid if sugar holds its present price. The Potato Growers' Association shipped 140 carloads of potatoes during the month, the price ranging from 90 cents to \$1.10 for Russets and 55 to 70 cents for Rurals.

Milk River project, Montana.—Hay and alfalfa prices declined somewhat during the month, probably owing to the open season and the light demand for feed.

The first carload of corn ever shipped from Phillips County left Malta for Great Falls in December, the price paid being 72 cents per bushel.

Sun River project, Montana.—A small quantity of hay was baled and a considerable portion of the grain hauled to the elevators. A considerable acreage of stubble ground was plowed. The alfalfa market was poor and few sales were made. Good prices were obtained for eggs and dairy products.

Lower Yellowstone project, Montana-North Dakota.—A mass meeting of farmers was held at Sidney on December 27 at which the Montana Beet Growers' Association was organized. The project was divided into 10 districts with a director from each, and the Williston irrigation project was included with one director. The object of the association is

PUBLIC LAND FARM UNITS ARE OPENED

Secretary of the Interior Work has signed a public notice opening to entry 12 public land farm units on the Arrow-rock division of the Boise irrigation project in southern Idaho. Water for the farm units will be available beginning with the irrigation season of 1924. Those units are all good farming land, surrounded by well-improved farms.

The construction charge for these units is \$77.44 per irrigable acre, subject to readjustment every five years according to an agreement entered into with the Payette-Boise Water Users' Association. An initial payment of 5 per cent of the construction charge must be made at the time of filing water-right application, and the remainder of the charge must be paid in 15 annual installments, the first 5 of which are each 5 per cent and the remainder each 7 per cent of the total construction charge. The units are also subject to an annual operation and maintenance charge to cover the cost of operating the irrigation system, and also to a drainage charge to cover the cost of any drainage system that may hereafter be constructed.

The opening will take place on February 8, 1924, and ex-service men have a preference right of entry of 90 days, or until May 12, 1924, when any unentered units will be opened to the general public.

to assist in the production and marketing of sugar beets.

Newlands project, Nevada.—The market for alfalfa continued strong, the price advancing to \$13 per ton in the stack and to \$16.50 per ton f. o. b. Fallon. Most of the surplus hay had been disposed of.

Carlsbad project, New Mexico.—Cotton picking proceeded until the 12th, when it was interrupted by a snowstorm, and was not resumed until after Christmas. About 8,000 bales had been ginned at the end of the month.

Rio Grande project, New Mexico-Texas.—All except about 10 per cent of the cotton crop had been ginned. The 1923 crop census shows that the gross value of crops per acre was almost double that of previous years.

Umatilla project, Oregon.—The hay and alfalfa markets were poor. However, marketing of hay is expected to be improved by reductions in freight rates, effective January 21. The reduction in rates from Hermiston to coast points will vary from \$2 to \$3.30 per ton.

Belle Fourche project, South Dakota.—The corn crop, which was the largest grown on the project, had been harvested and some of it sold at the elevator at 75 cents per hundredweight on the cob. Most of the crop, however, was being fed to stock. The per acre value of this crop was about \$20, compared with an average of \$12 for all crops in 1923.

Strawberry Valley project, Utah.—Practically all fall plowing was completed before freezing weather. About 120,000 tons of sugar beets were handled by the three sugar factories, making one of the best years in the history of the industry on the project. Alfalfa hay and cereals advanced slowly in price during December, and the demand was light. The crop census was being compiled and indications pointed to better yields and a 25 to 30 per cent increase in the returns per acre over 1922.

Okanogan project, Washington.—Practically all of the apples had been shipped with the exception of Winesaps, which were gradually being moved at the end of the month. The market was still weak.

Yakima project, Washington.—There was practically no movement of crops, aside from shipping apples and potatoes from storage. The farmers were engaged in pruning, plowing, and disking, as weather permitted.

Shoshone project, Wyoming.—Sugar-beet harvesting was completed early in the month, and grain threshing was practically completed by the middle. The farmers were busy hauling loose hay to the alfalfa mill and baled hay for shipment. There was little marketing of potatoes.

ENGINEERS IN REPORT ON FLATHEAD WATERS

Flathead Lake, in northwestern Montana, is well situated for storage of water for power development or for irrigation, according to a report of Government engineers to the Department of the Interior.

The area draining into the lake, the report says, is about 7,010 square miles, and the mean annual discharge from the lake is about 8,330,000 acre-feet. At low water the elevation of the lake is 2,882 feet above sea level with an area of 120,000 acres. There is no artificial regulation of the lake at present.

The engineering report also points out that in case Flathead Lake should be used for the storage of water, there will be a large area of agricultural land bordering the north end of the lake that would be flooded more than it is under natural conditions and would be rendered unfit for cultivation. Smaller lakes above Flathead Lake were examined to determine whether storage was feasible in them. They were Tally Lake, Lower Stillwater Lake, Upper Stillwater Lake, Whitefish Lake, and Swan Lake. Of these it was decided that Whitefish Lake was the only one that could be used to store water for irrigation and power purposes, the others being already appropriated or the property damage being prohibitive.

Whitefish Lake collects the drainage of about 140 square miles, and the annual run-off is estimated at 165,000 acre-feet. The report further points out that it is understood the natural flow in the Flathead Valley, near Kalispell, is sufficient without storage for all likely irrigation in that region, and nothing is to be gained from increased elevation of water. In the future, the report concludes, it may become profitable to build for storage in some of these small lakes, but at present there appears to be no demand sufficient to pay the cost either in connection with or independent of the Columbia Basin project.

ALFALFA MEAL MILL AIDS ORLAND FARMERS

During the past season the Orland alfalfa meal mill, on the Orland project, California, paid out approximately \$37,500 for hay and labor costs. About 4,000 tons of hay were brought to the mill at an average price of \$9 per ton.

It is planned to put in a new grinder which will greatly increase the present capacity of the mill, so that next year a larger part of the crop can be handled.

The alfalfa industry on the project is progressing favorably and brings in excellent returns on the money invested.



Cement lined section of the main canal on the Carlsbad project, New Mexico.

OPERATION OF INDIAN PROJECTS TRANSFERRED

Operation and maintenance of irrigation projects located in the Blackfeet, Flathead, and Fort Peck Indian Reservations in the State of Montana now in charge of the Bureau of Reclamation have been transferred to the Bureau of Indian Affairs.

The transfer of the management of the Blackfeet and Fort Peck projects is set for March 1, 1924; and for the Flathead project is effective as to operation and maintenance by the beginning of the irrigation season and as to construction by July 1.

For a number of years the Bureau of Reclamation has acted in the capacity of an agent for the Bureau of Indian Affairs in the construction and operation of certain of the Indian irrigation projects, including those on the Blackfeet, Flathead, and Fort Peck Indian Reservations. This was a natural consequence of the conditions then existing, in that the Bureau of Reclamation was engaged in constructing and operating large irrigation projects under the provisions of the reclamation act and had the necessary force and equipment to handle this work for the Bureau of Indian Affairs. In recent years the amount of construction to be done on these Indian projects has been reduced, with the result that there is no necessity for the Bureau of Reclamation handling them.

The fact that the operation of the Blackfeet, Flathead, and Fort Peck irrigation projects requires constant contact with the Indians also led to the decision that the Bureau of Indian Affairs should handle them rather than another bureau of the Government not acquainted with Indian characteristics and habits.

REPORT ON COLUMBIA BASIN MADE IN MARCH

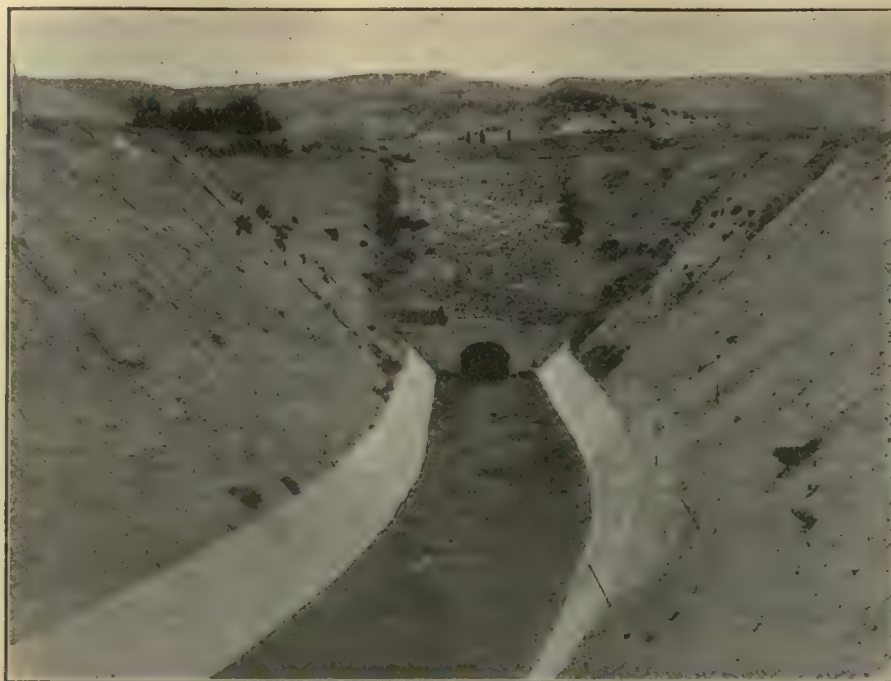
The final report on the proposed Columbia Basin irrigation project will be submitted to Congress about the middle of March by the Secretary of the Interior.

The commission having charge of the investigation is composed of Assistant Secretary of the Interior Francis M. Goodwin, Commissioner D. W. Davis of the Reclamation Bureau, and F. E. Weymouth, chief engineer of the Reclamation Bureau.

Information was given out by Chairman Goodwin of the commission recently to the effect that the field investigations have been completed. The office maintained at Spokane, Wash., will be closed the middle of February after final data for the report have been compiled. At the present time the soil survey and geological survey have been finished. Studies of the water supply of the entire Columbia River Basin have also been tabulated and will be submitted to the commission at an early date.

At present the force of engineers conducting the field work is busy preparing estimates of costs, profiles for dams, and the necessary canal systems. All of this information is expected to be in the hands of the commission headed by Assistant Secretary Goodwin by March 1, after which the final report will be prepared and submitted to Congress about the 15th of March.

Pigs will live and get fat on the feed that grows in any good country. It isn't necessary to live in the Corn Belt to have pigs.



Outlet of the six-mile Gunnison tunnel, on the Uncompahgre project, Colo., bringing water from the Gunnison River to the fertile fields of the Uncompahgre Valley.

COWICHE CREAMERY PAYS OUT \$78,000 PER YEAR

In 1916 a creamery was established at Cowiche, Wash., which is almost in the center of the Tieton division of the Yakima project. It employs 8 men the year round, and 1,000 pounds of cheese are manufactured daily; 12,500 pounds of milk are used per day, and the farmers receive from 48 to 50 cents per pound on butterfat test. Five hundred and twenty-five head of cows are being milked by the farmers in the immediate vicinity to supply the 375,000 pounds of milk used monthly. Payments for milk and cream are made every two weeks, and the monthly payment to farmers is \$6,500, or \$78,000 per year.

A very fine grade of cheese is manufactured, practically all of which is used in the valley and by the Northern Pacific Railway on its dining cars.

Cowiche is one of the prosperous communities of the Tieton division of the Yakima project and is made up of a lot of first-class farmers. Mr. W. E. Thompson, one of the board of directors of the Tieton Water Users' Association, states that in his opinion a part at least of the community's prosperity can be attributed to the presence of the creamery, which is a source of ready money to those farmers who keep a sufficient number of cows to sell milk in any quantity.

The total value of the poultry raised in the United States in 1922 was \$381,178,000, of which amount chickens accounted for \$354,199,000.

DAIRY STOCK INCREASE, FLATHEAD PROJECT

The annual water-users' census of the Camas division of the Flathead (Indian) project shows that the number of dairy cattle increased from 246 head in 1922 to 480 head in 1923. There are 57 herds, of which 19 contain more than 10 animals. The largest herd has 35 and the smallest 1. There are 15 head of registered Holsteins, 11 head of registered Guernseys, and 1 registered Guernsey bull. The farmers are planning to form a cow-testing association.

One Guernsey heifer from this division took first prize over all contestants at the Montana State Fair at Helena.

Farmers of this locality have always been strong for beef cattle ranged in forests adjacent to the irrigable lands. The trend is now toward dairy stock of good quality.

In connection with the building up of the dairy industry on the Milk River project, a carload of grade Guernsey cattle was shipped in recently from Wisconsin to Hinsdale and Glasgow, Mont.

The Montana Mutual Dairy Loan Association brought 525 high-grade dairy cows and 40 purebred bulls into western Montana during 1923.

DEATH OF H. H. BROOK, RIO GRANDE PROJECT

It is with sincere regret that the Reclamation Record records the death on January 5 of H. H. Brook, president of the board of directors of the Elephant Butte Irrigation District on the Rio Grande project, New Mexico-Texas.

President Brook showed remarkable ability in his handling of the affairs of the district, and by close study, in spite of his delicate physical condition, acquired an unusually thorough knowledge of the Rio Grande project.

His efforts in the interests of the district were not guided solely by a selfish desire for its advancement, but were tempered by a notable fairness in considering the interests of the public generally.

He was one of the prime movers in organizing the cooperative associations for the production and marketing of the varied agricultural products, livestock, and poultry of the water users.

Mr. Brook's death is a great loss to the district and to the Bureau of Reclamation.

UMATILLA PROJECT HAS FAMOUS HONEY PRODUCER

J. Skovbo, a water user on the Umatilla project, Oregon, who was selected recently by the bee men to head the State organization of beekeepers, is the largest individual honey producer in the State.

Skovbo settled in Hermiston in 1908 and 11 years ago purchased three colonies of bees. From this small beginning his business has grown until to-day he has 600 colonies that produce annually 30 tons of honey.

Skovbo believes in the future of Umatilla County as a honey-producing center, and states that the possibilities on the project for bee men are many, as the development of the project means the branching out of the bee industry. At present Umatilla County ships more honey than any other county in the State, totaling 150 to 200 tons annually.

A farm is more than a business enterprise. A farm is a business enterprise and a home combined. The family lives on the farm, works on the farm. The farm is a combination factory, workshop, office, and eating, living, and sleeping quarters for the whole family.

On a good farm there is work every day for every member of the family. The boys and girls can help feed and clothe the family. They can own something of their own. They can earn their own money.

ADMINISTRATIVE ORGANIZATION OF THE BUREAU OF RECLAMATION.

DEPARTMENT OF THE INTERIOR.

HON. HUBERT WORK, Secretary of the Interior.
EDWARD C. FINNEY, First Assistant Secretary.
FRANCIS M. GOODWIN, Assistant Secretary.
JOHN H. EDWARDS, Solicitor for the Interior Department.
EBERT K. BURLEW, Administrative Assistant to the Secretary.
JOHN H. MCNEELY, Assistant to the Secretary.
JOHN HARVEY, Chief Clerk.

BUREAU OF RECLAMATION.

WASHINGTON, D. C.

David W. Davis, commissioner; Ottomar Hamele, chief counsel; J. B. Beadle, chief clerk; C. A. Bissell, engineer; J. M. Luney, chief accountant; W. A. Meyer, Yakima, Wash., and W. F. Kubach, Denver, Colo., examiners of accounts.

DENVER, COLO., WILDA BUILDING.

F. E. Weymouth, chief engineer; R. F. Walter and C. P. Williams, assistant chief engineers; Miss L. H. Meisel, secretary to the chief engineer; Barry Dibble, electrical engineer; J. L. Savage, designing engineer; James Munn, engineer; J. R. Ummel, chief clerk; A. McD. Brooks, purchasing agent; Harry Caden, fiscal agent.

Miles Cannon, field commissioner; H. L. Holgate, assistant field commissioner; B. E. Hayden, industrial agent; C. R. Trowbridge, chief inspector.

PROJECT ORGANIZATION.

Belle Fourche Project.—..... project manager, Newell, S. Dak.; R. C. Walber, chief clerk.

Boise Project.—J. B. Bond, project manager, Boise, Idaho; E. R. Mills, chief clerk; C. F. Weinkauff, fiscal agent.

Boise Project, Black Canyon Dam.—Walter Ward, construction engineer, Emmett, Idaho; M. J. Gorman, chief clerk; T. W. Hause, fiscal agent.

Carlsbad Project.—L. E. Foster, project manager; Carlsbad, N. Mex.; V. L. Minter, chief clerk and fiscal agent.

Grand Valley Project.—S. O. Harper, project manager, Grand Junction, Colo.; W. J. Chiesman, chief clerk; C. E. Brodie, fiscal agent.

Huntley Project.—A. R. McGinness, project manager, Ballantine, Mont.; H. S. Elliott, chief clerk; Miss M. C. Simek, fiscal agent.

King Hill Project.—George H. Harris, acting project manager, King Hill, Idaho; E. V. Hillius, chief clerk and fiscal agent.

Klamath Project.—H. D. Newell, project manager, Klamath Falls, Oreg.; N. G. Wheeler, chief clerk; G. R. Barnhart, fiscal agent.

Lower Yellowstone Project.—H. A. Parker, project manager, Savage, Mont.; E. R. Scheppelmann, chief clerk.

Milk River Project.—G. E. Stratton, project manager, Malta, Mont.; E. E. Chabot, chief clerk; J. T. M. Culbertson, fiscal agent.

Minidoka Project.—Edward B. Darlington, project manager, Burley, Idaho; E. C. Diehl, chief clerk; Miss A. J. Larson, fiscal agent.

Minidoka Project, American Falls Reservoir.—F. A. Banks, engineer in charge, American Falls, Idaho; H. N. Bickel, chief clerk; O. L. Adamson, fiscal agent.

Newlands Project.—J. F. Richardson, project manager, Fallon, Nev.; A. W. Walker, engineer; G. B. Snow, chief clerk; Miss Ethel M. Slimmonds, fiscal agent.

North Platte Project.—Andrew Weiss, project manager, Mitchell, Nebr.; H. W. Bashore, engineer, Fort Laramie Division; T. W. Parry, irrigation manager; L. H. Mong, chief clerk; V. E. Hubbell, fiscal agent.

Okanogan Project.—Calvin Casteel, project manager, Okanogan, Wash.; W. D. Funk, chief clerk and fiscal agent.

Orland Project.—R. C. E. Weber, project manager, Orland, Calif.; E. T. Eriksen, engineer; C. H. Lillingston, chief clerk and fiscal agent.

Rio Grande Project.—L. M. Lawson, project manager, El Paso, Tex.; C. A. Peavey, chief clerk; L. S. Kennicott, fiscal agent.

Riverton Project.—H. D. Comstock, project manager, Riverton, Wyo.; L. H. Mitchell, engineer; R. B. Smith, chief clerk; W. J. Fogarty, fiscal agent.

St. Mary Storage Division.—R. M. Snell, project manager, Browning, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Salt River Project.—Being operated by the Salt River Valley Water Users' Association; C. C. Cragin, general superintendent and chief engineer, Phoenix, Ariz.

Shoshone Project.—J. S. Longwell, project manager, Powell, Wyo.; J. E. Iakisch, engineer; C. M. Jump, superintendent of irrigation; W. F. Sha, chief clerk; Mrs. O. C. Knights, fiscal agent.

Strawberry Valley Project.—W. L. Whittemore, project manager, Provo, Utah; H. R. Pasewalk, chief clerk; W. C. Berger, fiscal agent.

Sun River Project.—G. O. Sanford, project manager, Great Falls, Mont.; H. W. Johnson, chief clerk; F. C. Lewis, fiscal agent; G. A. Benjamin, irrigation manager, Fairfield, Mont.

Umatilla Project.—H. M. Schilling, project manager, Hermiston, Oreg.; G. C. Patterson, chief clerk; Miss M. G. Valentine, fiscal agent.

Umatilla Project, McKay Dam.—R. M. Conner, superintendent of construction; Ralph Lowry, engineer in charge, McKay Dam, Oreg.; C. B. Funk, chief clerk; W. S. Gillogly, fiscal agent.

Uncompahgre Project.—L. J. Foster, project manager, Montrose, Colo.; G. H. Bolt, chief clerk; F. D. Helm, fiscal agent.

Williston Project.—W. S. Arthur, project manager and chief clerk, Williston, N. Dak.; H. C. Melas, fiscal agent.

Yakima Project.—J. L. Lytel, project manager, Yakima, Wash.; R. K. Cunningham, chief clerk; J. C. Gawler, fiscal agent; M. D. Scroggs, superintendent of irrigation, Sunnyside, Wash.; J. S. Moore, superintendent of irrigation, Route 6, Yakima, Wash.

Yakima Project, Tieton Dam.—F. T. Crowe, construction engineer, Rimrock, Wash.; C. F. Gleason and W. C. Christopher, engineers; V. G. Evans, chief clerk; C. F. Williams, fiscal agent.

Yuma Project.—P. J. Preston, project manager, Yuma, Ariz.; R. M. Priest, superintendent of construction; D. C. McConaughy, engineer, Yuma Mesa Division; D. C. Caylor, superintendent of irrigation; C. A. Denman, chief clerk; E. M. Philebaum, fiscal agent.

INDIAN PROJECTS.

Blackfeet Project.—R. M. Snell, project manager, Browning, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Flathead Project.—C. J. Moody, project manager, St. Ignatius, Mont.; J. M. Swan, chief clerk; J. P. Siebeneicher, fiscal agent.

Fort Peck Project.—E. L. Decker, acting project manager, Poplar, Mont.; Henry Berryhill, chief clerk and fiscal agent.

FIELD LEGAL OFFICES.

Boise, Idaho.—B. E. Stoutemyer, district counsel. Projects: Boise, Minidoka, King Hill, and Jackson Lake Enlargement.

Denver, Colo.—Legal section, offices of chief engineer and field commissioner; R. M. Patrick and Armand Offutt, district counsel.

El Paso, Tex.—J. N. Beardslee, district counsel. Projects: Rio Grande, Carlsbad, and Hondo.

Helena, Mont.—E. E. Roddis, district counsel, Helena, Mont. Projects: Blackfeet, Flathead, Fort Peck, Huntley, Milk River, St. Mary Storage, Sun River, Williston, Lower Yellowstone, and Shoshone.

Mitchell, Nebr.—Brooks Fullerton, district counsel. Projects: North Platte, Belle Fourche, and Riverton.

Montrose, Colo.—J. R. Alexander, district counsel. Projects: Grand Valley, Uncompahgre, and Strawberry Valley.

Portland, Oreg.—....., district counsel, Post Office Building. Projects: Yakima, Okanogan, Umatilla, Klamath, and Baker.

San Francisco, Calif.—P. W. Dent, district counsel, 349 Pacific Building. Projects: Salt River, Yuma, Orland, and Newlands.

FIELD COMMISSIONER OPENS DENVER OFFICE

MILES CANNON, recently appointed by Secretary of the Interior Work as field commissioner of the Bureau of Reclamation, has established his office in the Wilda Building, Denver, Colo., where he will have charge of the management and agricultural development of the irrigation projects.

This step is in pursuance of the reorganization of the Bureau of Reclamation along business and agricultural lines to coordinate various activities; to aid the farmers in raising better and more diversified crops, and in applying modern business methods in handling, marketing, and realizing upon the crops produced; to effect economies wherever possible, and in every way to improve not only the condition of the water users on the projects but the administration of the projects by the Department of the Interior.

Associated with Commissioner Cannon at Denver are H. L. Holgate, formerly district counsel at Portland, Oreg., as assistant field commissioner; B. E. Hayden, formerly project manager of the Belle Fourche project, South Dakota, as industrial agent, and C. R. Trowbridge as chief inspector.

All matters relating to the settlement of the projects are being handled by Commissioner Cannon, and inquiries concerning opportunities for prospective settlers should be addressed to him.

THE various reclamation projects are widely different in character in many ways—in the kind of soil, in the kind of climate, in the supply of water, in the kind of market, in distance to market, in freight rates, in transportation facilities, and many other matters that affect the actual cash productivity of the lands.

A very careful investigation should be made as to what is the real net cash value per acre of the irrigated land, the fair and ordinary cash return to the farmer on each of these projects. Find out what he can reasonably pay after his living and other expenses and properly caring for his family, educating his children, and having something fair besides for a hard year and unforeseen contingencies. And wherever the charges on any project are more than he can pay, those charges have got to sooner or later be reduced. And it is much better and fairer and more humane and just to reduce them now and keep the original settlers on the land than it is to starve them out and then expect some new settlers to come in sometime and try to work out.

—Representative Edward T. Taylor, of Colorado.

NEW RECLAMATION ERA

VOL. 15

MARCH, 1924

NO. 3



GRAPEFRUIT FOR EVERYBODY FROM THE YUMA PROJECT, ARIZONA-CALIFORNIA.

NEW RECLAMATION ERA

WITH this issue of "THE RECLAMATION RECORD" its name is changed to the "NEW RECLAMATION ERA".

The reason for this is obvious.

A new era has been born in Government reclamation, and it is fitting that its official publication should denote the birth of the new régime through a change in its title.

The "NEW RECLAMATION ERA" is a magazine for the farmers and personnel of the service. Its aim is to assist the settlers in the proper use of water; to help them in overcoming their agricultural difficulties; to instruct them in diversifying and marketing their crops; to inspire the employees of the service and chronicle engineering problems and achievements; and to promote a whole-hearted spirit of cooperation, so that reclamation shall attain the greatest heights of success.

Important changes have already been made in the editorial policy of this publication as well as in the make-up. Many technical discussions have been omitted and news of the Department in Washington and the Reclamation Bureau generally has taken their place. Instructive articles with illustrations on the best method of irrigation, as well as information designed to increase the productivity of lands, have been inserted. Other improvements in the magazine will be made in the future.

The new era just beginning is destined to bring a complete metamorphosis in the policy and method of Government reclamation and the "NEW RECLAMATION ERA" will record its stirring history of progress.

NEW RECLAMATION ERA

Issued monthly by the Department of the Interior, Bureau of Reclamation, Washington, D. C.

HUBERT WORK
Secretary of the Interior

DAVID W. DAVIS
Commissioner, Bureau of Reclamation

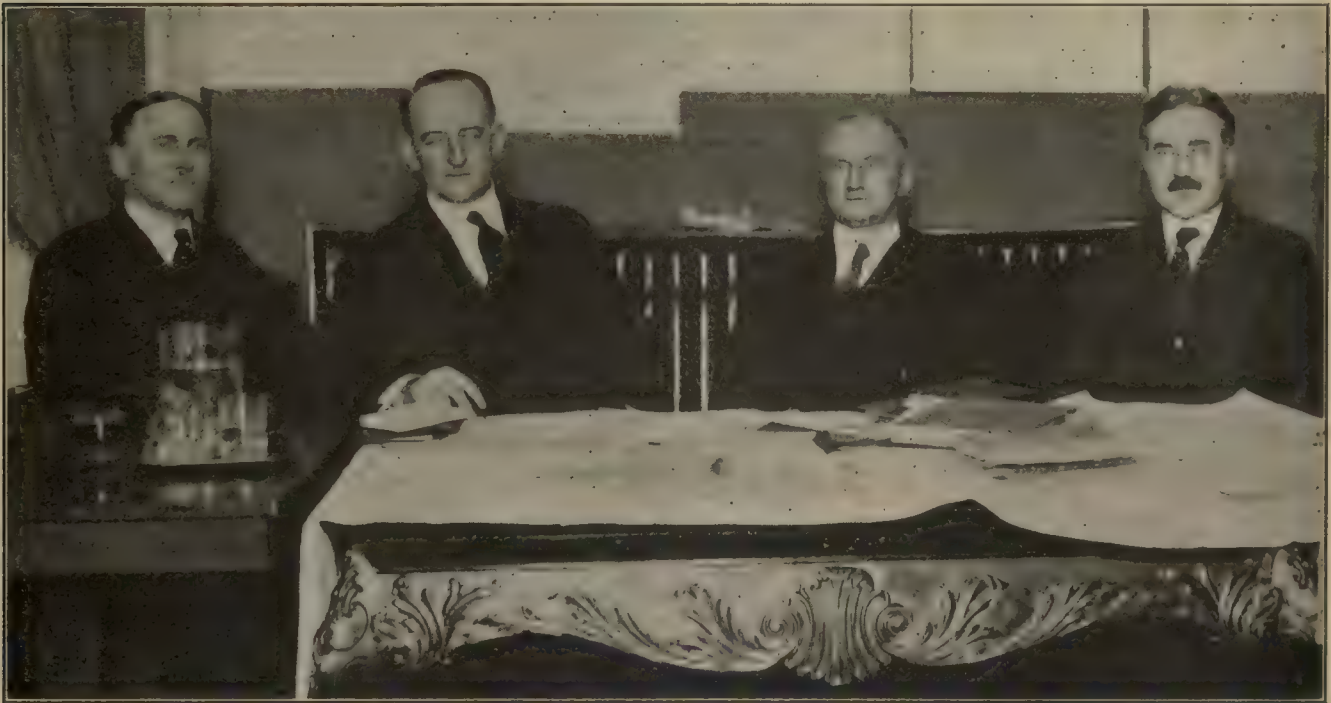
Vol. 15

MARCH, 1924

No. 3

PUBLIC HEARINGS OF SPECIAL ADVISORS DRAW BIG CROWD

Water users' association and representatives of water users from every government project except Williston give evidence at Salt Lake City of conditions and suggest remedies.



The Special Advisory Committee at the Salt Lake hearings. Left to right: Hon. James R. Garfield, Hon. Thomas E. Campbell, Dr. Elwood Mead, and Dr. John A. Widtsoe.

A NEW era in reclamation came into existence at Salt Lake City, Utah, during the month of January when the Special Advisory Committee appointed by Secretary of the Interior Work held an open hearing lasting for over 10 days.

For the first time in history farmers and water users on Government projects were given the opportunity to publicly express their opinions and present remedies for the solution of their difficulties before a disinterested commission named for the purpose of putting reclamation on a business basis in the future.

The members of the Special Advisory Committee present throughout the sessions included: Former Governor Thomas E. Campbell, of Arizona, chairman; Dr.

John A. Widtsoe, of Utah, secretary; former Secretary of the Interior James R. Garfield, of Ohio; and Hon. Elwood Mead, of California, eminent reclamation engineer.

The attendance at the hearing was the largest ever known in any meeting called together to study Government reclamation. Representatives of water users' associations and water users came to Salt Lake City from all the projects except the Orland, in California, and the Williston, in North Dakota, to present evidence and testimony before the Special Advisory Committee, the Orland project sending a communication from its water users' organization instead of appearing personally.

The total number present reached 225, representing 24 primary Government projects and 12 secondary projects. Outside of briefs filed with the committee by the delegates from the various projects, there were over 4,000 pages of stenographic reports of the oral testimony that was taken down and will be made a permanent part of the official records of the Department of the Interior for future use. The meeting was opened with a message from Secretary of the Interior Work, which read as follows:

"Please express to the delegates to your conference my appreciation of their attendance and interest in what I believe will prove to be a most important epoch

(Continued on page 34.)

BELLE FOURCHE RESOLUTIONS

THE following resolutions have been adopted by the Belle Fourche Irrigation District of the Belle Fourche project of South Dakota:

"Be it resolved, That the directors of the Belle Fourche Irrigation District, South Dakota, have followed with deep interest the administration of the Reclamation Bureau under the Hon. Hubert Work, Secretary of the Interior, as set forth particularly in the RECLAMATION RECORD in issues thereof since August, 1923; that we indorse and commend his policy of reorganizing the said bureau which results in separating the engineering and administrative activities, and for the appointment of the Fact Finding Commission to investigate conditions which exist in the several projects with a view of determining what is proper and necessary for reclaiming reclamation; that the economic survey which is being made of the several projects, in our humble opinion, is the only correct foundation for determining the difficulties of the reclamation settlers and for pointing the way for relief measures; and that your adoption of this basic principle is the greatest encouragement which has come

to project settlers since the commencement of irrigation reclamation activities.

Dated this 5th day of February, 1924.

BELLE FOURCHE IRRIGATION

DISTRICT, SOUTH DAKOTA.

CHARLES M. REID, *President*.

Attest:

W. D. BUCHHOLZ, *Secretary*.

Be it resolved, That the board of directors of the Belle Fourche Irrigation District, South Dakota, have followed with great satisfaction, the deep interest, intense study, prodigious industry, and unselfish devotion, of the members of the Fact Finding Commission in their comprehensive study of the reclamation policies of the Federal Government; we commend particularly its policy of making an economic survey of the projects for the purpose of determining the shortcomings of the reclamation policies and to point out the needed measures of relief; we await in confidence recommendations from the Fact Finding Commission which will impress the honorable Secretary of the Interior and Members of Congress favorably, and which will tend to restore hope to the distressed settlers, resettlement of the Federal projects, and

ultimate success of the Federal reclamation policies.

Dated this 5th day of February, 1924.

By THE BOARD OF DIRECTORS,

BELLE FOURCHE IRRIGATION

DISTRICT, SOUTH DAKOTA.

By CHARLES M. REID, *President*.

Attest:

W. D. BUCHHOLZ, *Secretary*.

Be it resolved by the board of directors of the Belle Fourche Irrigation District, South Dakota, That we are pleased to commend the record of B. E. Hayden as project manager of the Belle Fourche Irrigation Project for the past nine years; that in addition to his Government position Mr. Hayden has always been actively interested and industrious in movements for community development, such as interesting settlers in the project, long-time loans for the farmers, diversified farming, and location of industries. It seems to us that his training, temperament, and experience will equip him for the new and larger responsibilities involved in his present appointment in the Denver office of the United States Reclamation Bureau.

Dated this 5th day of February, 1924.

By THE BOARD OF DIRECTORS,

BELLE FOURCHE IRRIGATION

DISTRICT, SOUTH DAKOTA.

By CHARLES M. REID, *President*.

Attest:

W. D. BUCHHOLZ, *Secretary*.

PUBLIC HEARINGS OF SPECIAL ADVISORS

(Continued from page 33.)

in the history of reclamation. I am tremendously interested in the study of reclamation in its broadest aspects, and my only object is that the future of reclamation may be assured. Its past is of interest only as it may give notice of that which should be avoided and encourage the use of experience which has proven to be sound. Because of the careful and thorough investigation that is being made by the Advisory Committee which you represent, with the assistance that is being cheerfully given to it and to the department by those living on projects, the future of reclamation was never as bright as now, or its foundations as safe."

Evidence presented by the water users and their representatives throughout the 10 days' hearing dealt with every phase of reclamation, both agricultural, engineering, and economic. Some of the pertinent questions brought forward were the necessity for a complete rearrange-

ment of the Government's present methods and policies dealing with reclama-

COMMITTEE WILL MAKE ITS REPORT IN MARCH

THE final report of the Committee of Special Advisers on Reclamation will be presented to the Secretary of the Interior about the middle of March.

Announcement to this effect was recently made by ex-Governor Thomas E. Campbell, chairman of the committee. The report upon completion will be submitted by the Secretary of the Interior to the President and to the Congress.

The special advisory committee began its exhaustive study of reclamation methods and policies of the Government on October 15, 1923, and has been in almost continuous session since that date.

tion, if it is to succeed. Plans were advanced for changes in the treatment of agricultural problems on the individual projects, for a revision of the present system of finance, for a new mode of operation and organization on each project, and for some sort of definite and permanent relief from the heavy burden of repayments to the Government covering construction costs.

Because of a special plea of the Newlands project water users in Nevada asking for a personal investigation by the Special Advisory Committee of their project, arrangements were made to have Hon. Elwood Mead, a member of the committee, make a trip to the Newlands and examine individually into the situation there. At the conclusion of the Salt Lake City conference the Special Advisers returned to Washington and began a series of meetings at which the entire membership of the committee was present for the purpose of preparing their final report to the Secretary of the Interior. The report on completion will be submitted to the President and to the Congress.

WATER USERS REQUEST CHANGE IN RECLAMATION POLICY.

Resolutions adopted by representatives of projects following taking of evidence at Salt Lake City before Special Advisory Committee advocate change in present statutes.

THE following resolutions were adopted by representatives of water users and water-users' associations on a number of reclamation projects at the conclusion of the proceedings of the Special Advisory Committee at Salt Lake City, Utah, in January:

1. *Resolved*, That we favor early congressional action definitely authorizing and empowering the Secretary of the Interior at his discretion to suspend, readjust, and reassess all existing charges against the water users on reclamation projects, in accordance with the recommendations of President Coolidge to Congress.

2. *Resolved*, We suggest the land on the projects be classified according to the best methods known at the present moment, understanding that land which has no chance of paying out be not included in any group; also that a system be evolved to make this plan practicable.

3. *Resolved*, That each class of land shall return on March 1 construction repayments for the preceding year of not to exceed 5 per cent of the gross crop returns of the class to which it belongs, taking into consideration the probable net returns until the total charges assessed against said land are repaid to the reclamation fund.

4. *Resolved*, That when the individual water user pays the construction charges assessed his land, said land is released by the Government from any further charges of liens, whether held under district form or water-users' form of contact.

5. *Resolved*, That the management and control of all completed projects, or of completed units of a project, and all assets of said project be turned over to the water users, under appropriate contract, who have the right to decide whether they organize as an irrigation district or as a water-users' association.

6. *Resolved*, That a moratorium on all construction repayments be declared, the length of time for each project to be determined by the Secretary of the Interior, and at the time so designated, all construction costs due against the land, together with all accruals, including operation and maintenance then past due, be combined and set over to said date, when construction repayments will again accrue and be paid according to the crop repayment plan.

7. *Resolved*, That the water users on the projects are unable to pay interest on ac-



Irrigating 5 and 10 acre farm units on the Orland project, California.

crued construction costs, and they ask that all accrued penalties and interest be canceled and that penalties and interest which have been paid by the individual water users be returned and credited to the individual's construction account then due.

8. *Resolved*, That the general expense now charged against the various projects, the large item of which goes to maintain the Denver and Washington offices, be borne in the future by the General Treasury, as is common to other departments of the Government.

9. *Resolved*, That we are not sufficiently informed to make recommendations relative to the exacting of a definite percentage of the increase in price in the case of a land transfer and applying said amount to the Government's lien.

10. *Resolved*, We favor the idea of financing under the Reclamation Service, where the projects request, of bringing new lands under cultivation and supplying buildings and chattels.

11. *Resolved*, We favor the idea of appointing of competent agricultural supervision on projects where same seems necessary.

12. *Resolved*, That all revenues derived from power or from any other source made possible by the project be credited to said project according to the law applicable thereto and that said assets be-

come a part of the project and inseparable therefrom and that no disposition of said assets be made without the consent of the water users.

13. *Resolved*, That public notice on new projects be withheld in the future until an economic survey indicates payments should begin.

14. *Resolved*, We recommend that when bills are drafted or are caused to be drafted by the department to put into effect the recommendations of this commission or such recommendations as may be approved that representatives of the water users on the projects be invited to join in the conference for drafting such legislation.

15. *Resolved*, The projects wish to express to Secretary Work their appreciation of the appointment of the Fact Finding Commission and to the commission their appreciation for the kind, patient, courteous, fair, and open manner in which the Salt Lake hearing has been conducted.

Respectfully submitted.

LEE R. TAYLOR,
JAMES T. WHITEHEAD,
L. J. MAGEE,
W. D. BUCHHOLZ,
F. G. TRACY,

Committee.

PICTORIAL LESSONS IN PRACTICAL IRRIGATION.

LESSON No. 3.



The canvas dam is an efficient aid to the irrigator. Scene on the Shoshone project, Wyoming.

THE practical irrigator soon learns that his chief labor is to guide water over the land. No land is wholly level or perfectly even in slope. With the best preparation there are high and low places in the fields, which determine the direction of the flow of water unless controlled by the irrigator. Even under the furrow system of irrigation the water must be changed from furrow to furrow as irrigation progresses. It is the task of the farmer to guide the water properly over the land for the purpose of securing successful crop production, though at times water must be directed from its natural direction of flow. To accomplish this, the shovel is the most useful tool. A few shovelfuls of earth make temporary dams to back up the water in the laterals and to force it over the high places in the field or into other furrows. While these small earthen dams are easily made, and as easily broken where the area in question has been irrigated, yet since in each irrigation of a field several such temporary dams may be needed, considerable labor and time are involved. Instead of throwing up such earthen obstruction, a piece

GET SOME DAIRY STOCK

"To every farmer on irrigation projects I say, by all means get some dairy stock," says I. D. O'Donnell, of Billings, Mont., adding that "dairying provides a cash income for the farmer 12 months in the year; furnishes a sure and profitable market for forage and grain crops; provides, through fertilizer, for the upkeep of the soil; and aids in the establishment of a system of crop rotation and diversified farming to which every farmer should earnestly turn his attention."

"However," says Mr. O'Donnell, "it must be kept in mind that success in dairy work depends entirely upon the man. Get some dairy stock, make your plans well ahead, handle the work in a businesslike and thorough manner, and you will be recompensed well and permanently."

of canvas cloth, known as a canvas dam, is thrown across the lateral. This serves to back up the water quite as effectively as the earthen dam, and relieves the farmer of the labor of throwing up the earth dam. When the irrigation is over the canvas dam is removed with ease. Thus both labor and time are saved. In addition, the use of the canvas thus leaves the laterals somewhat more sightly, because the moving of earth, for controlling irrigation water on a field, will be almost wholly unnecessary. By such simple devices as the canvas dam the ease and profitableness of irrigation may be greatly increased. The above illustration shows the canvas dam in the lower right-hand corner of the picture, directing the water from a lateral into a field ditch.

The dairy cow, the hog, and the hen comprise the three products of the farm that are the dividend payers for the farmers, and their raising and use should be more generally encouraged on the project farms.

PRINCIPLES OF IRRIGATION PRACTICE ARE OUTLINED.

Method of placing water on soil determines whether farms shall be profitable and whether plants shall be productive—Different ways of irrigation are many.

(By Dr. John A. Widstoe.)

Beginning in this issue the New Reclamation Era will publish a series of three articles on the Principles of Irrigation Practice, by Dr. John A. Widstoe, former President of the Utah Agricultural College and the University of Utah. Doctor Widstoe is an authority on reclamation of arid and semiarid lands and has been serving as Secretary of the Special Advisory Committee, studying reclamation during the past three months.

THE method of irrigation determines greatly the duty of water and the profitableness of irrigation. The considerable labor which always attends the application of water to land is one of the big charges to be made against irrigation, and one that must be made as low as possible. Besides, the method of irrigation frequently affects directly the degree to which plants may use the water applied.

Surface irrigation.—Surface irrigation is the method generally adopted in all irrigated countries. There is a great variety of methods of surface irrigation, most of which are scarcely worth consideration, because they either fail to recognize the natural laws underlying irrigation or their cost of installation is beyond practicability.

The approved methods of surface irrigation may be classified under two heads—first, the flooding method; second, the furrowing method. By the flooding method all the soil is covered by the water applied; by the furrowing method the water is guided in furrows or channels which traverse the whole field, but the water covers only a part of the soil surface. Both flooding and furrowing are used extensively in all irrigated regions. In one locality flooding may be the general method; in another, furrowing. The adoption of one or the other of these methods depends sometimes upon careful trials, but more often upon custom following the first practices.

The chief factors determining the choice between flooding and furrowing, are (1) the nature of the soil, (2) the contour of the land, (3) the head of the water stream, (4) the quantity of water available, and (5) the nature of the crop.

If the soil is light and "washes"—a condition existing over large areas of the irrigated section—furrowing is the only really practicable method. On such soils

the soil washing due to flooding often results in large channels, gullies, or "washes" being cut in the soil. On heavier soils, flooding may be practiced safely as far as erosion is concerned.

Many soils, after having been wetted, bake and form a hard crust, which is injurious to the soil and to the plant. On such soils the furrowing method is advisable, for by that method only a part of the surface is covered with water, and that part may be covered with loose earth by cultivation soon after irrigation. Other soils, after having been wetted, as they dry fall apart, forming natural mulches. On these soils flooding is quite safe.

On relatively level land either flooding or furrowing may be adopted. Flooding is best done when the slope of the land is not great, especially if the soil tends to "wash" easily. On steeper lands furrowing must be employed. The heavier the soil, the steeper may be the inclination; the lighter the soil, the gentler must be the inclination. On the relatively steep slopes, frequently used for orchards, furrowing alone is employed, and the sharp descents are overcome by carrying the furrows back and forth around the slopes with any desired fall. While no definite rule can be laid down as to the permissible inclination of lands under irrigation, yet a farmer soon learns by experience the practice best suited to his land. Farm irrigation systems should be laid out with reference to the contour of the land and, therefore, the irrigation farmer should first secure contour maps of the land which he intends to bring under irrigation.

By the "head" is understood the volume of water supplied to the unit of time. Under some systems of canal management farmers are given large streams of water for short times; under other systems small streams are available for longer periods. The total quantity of water at the end of the period may in either case be practically the same. A high head of water pushes rapidly over the land. Loose, sandy soils that absorb water rapidly must be irrigated with a high head of water, especially under the flooding method, or the water may all be drawn into the soil before the lower end of the field is reached. Under the flooding method a high head is suitable only for heavier soils. It follows that the furrowing method is best adapted where the head of water is low;

the flooding method where the head is high. This deduction has found practical expression over the whole irrigated area.

If irrigation water is abundant and a high head may consequently be secured, the flooding method is usually employed. If water is scarce, the main consideration is to make the total supply cover the largest number of acres, and the furrowing method is ordinarily employed, since by this method a small quantity of water may be made to cover much land. It has been shown that the productive power of water decreases as the total quantity applied to a given area is increased—that is, with each additional inch of water less dry matter is produced. Consequently where water is scarce it is more profitable to spread the small quantity of water over a large area of land. To do this the furrow method is indispensable. In irrigation practice, therefore, although the reason is not always understood, the furrowing method is invariably used wherever the supply of water is low.

The nature of the crop determines also the method of irrigation. Some plants are more sensitive than others to contact with water. It is believed by many that the sugar beet is injured whenever irrigation water is allowed to come into contact with it, especially if the day is hot. This may be true at times, but this danger is much exaggerated. Only when water stands against a plant for some time is injury really likely, and then injury comes either when the water is so hot as to cause sun scald or so cold as to chill the plant. In either case the process of growth is retarded. Much work yet needs to be done on this subject.

The various modifications of the flooding method may be grouped into (1) flooding open fields and (2) flooding closed fields. Open fields are those not surrounded by levees. Closed fields are those completely surrounded by levees, making a compartment into which water is admitted.

Permanent ditches.—A permanent system of ditches, having in view immediate and probably future needs, should be constructed on every farm to connect the canal with the field to be irrigated. The ditches should be placed so as to interfere as little as possible with regular agricultural operations, and they should conform either to the contour of the land or to some well-defined plan for dividing the

(Continued on page 38.)

AN IMPROVED PUBLICATION.

(From Powell (Wyo.) Tribune.)

A MARKED improvement is noted and fully appreciated in the last two or three numbers of the RECLAMATION RECORD. It is not slighting the merit of the publication in past years to say that the periodical is now greatly improved. This is because it has become less technical and more "human," to use the much abused term in modern reclamation discussion, but a word that seems to fit in better with present reclamation reforms than any other in the Tribune editor's limited vocabulary.

Those who are running the RECLAMATION RECORD now have caught on to more nearly what is wanted in a reclamation publication. It is just a human sympathy with the hardships—not a pessimistic sympathy, but an optimistic, boosting, and helpful sympathy.

Not only has Secretary of the Interior Work "humanized" the Reclamation

WATER USER COMMENDS BUREAU PUBLICATION

H. E. Richardson, Pomona, Calif., a settler on the Newlands reclamation project, has written the Commissioner of the Reclamation Bureau as follows:

"Thanks to you, I got my January number (of the RECLAMATION RECORD) and will say I was never so anxious to get it as now. I like the stand the new officers are taking at Washington, and I have taken new hopes for the project."

Service, as he boasted he would strive to do, but he has, to be consistent, "humanized" the official publication of the Bureau of Reclamation.

The attitude of the publication has changed. It erstwhile strove to maintain a favorable aspect to all reclamation; it strove to educate the settlers to the idea that they must more energetically meet their contract obligations. Never was the service in any manner criticized in its columns. It should have maintained an attitude of constructive criticism of the manifold faults of the engineers as well as the settlers. It fell into the same old rut of thought with the rest of the service that could see no wrong except with the settlers.

Now the RECLAMATION RECORD does not hesitate to produce the figures to show that Federal reclamation is not in all ways successful; that the farmers on projects are having their time of it along with the agricultural industry generally. But the publication is in every way hopeful, and we believe it will be a great help in stimulating the settlers of the projects to more successful endeavors.

HOW ELECTRICITY HELPS THE MINIDOKA PROJECT

"Sixteen years ago a dreary desert of greasewood and sagebrush, the Minidoka project to-day is one of the most productive and prosperous agricultural areas in America," says Benjamin F. Spittler, owner of one of the prize ranches in the project.

"But mere putting of water on the land has not been responsible for the ideal conditions that exist. The thing that keeps Minidoka women happy and the boys satisfied is the bringing of cheap electricity to the farms.

"Through the cooperative factor introduced by the community distribution of electricity and the necessity of pulling together in the operation of the canal systems, residents are frequently brought together in a business way, social development follows, and the building up of a community spirit is the result.

"In addition to the 25 mutual electric companies on the project, distributing electricity to 1,200 farmers and owned and managed by the farmers, we have co-operative cheese factories, cold storage plants, dairy and hog associations, and many other organizations. And we have developed the best school system in the State.

"We have completely done away with the chief bane of the country—isolation, loneliness, and drudgery. Country life as we live it is all-sufficient—therefore satisfying."



Outlet of Kachess dam, Yakima project, Washington.

HELPING THE DAIRY INDUSTRY BY A LOAN ASSOCIATION.

Most, if not all, of the irrigation projects of the Department of the Interior need more dairy stock. The formation of loan associations such as described below will help solve some of the financial problems.

STOCKING the irrigation projects with good dairy cows is a large task. Local banks frequently have not the means nor are they organized to do this in a large way. In the case of many of the water users, financial aid is necessary. The formation of mutual loan associations that will specialize in the promotion of the dairy business seems to meet the need. The plan of operation is similar to that of building and loan associations.

The authorized capital of such an association at the time of organization may, for example, be \$500,000, later increased to \$1,000,000 or more to provide for the growth of business. Four kinds of stock are sold: Class A, or investors installment stock; Class B, or partial payment stock; Class C, or paid-up stock; and Class D, or fully paid stock.

Class D stock amounts to about 4 per cent of the total and is sold at the beginning of operations to furnish working capital for early loans. Par value of all stock is \$100 per share. Investors, installment stock is sold upon the installment plan. Payment is made at the rate of 50 cents per share per month for 100 months, or until \$50 per share has been paid into the association treasury. Dividends are declared on this stock semiannually in proportion to the amount paid in by the member. They are computed and compounded semiannually, and at maturity the association pays the investor \$100 for each share of stock upon which he has paid \$50.

"Fully paid stock" is issued to investors, who at the time of purchase pay \$100 per share for each share of stock. Dividends on this stock may be left with the association and compounded semiannually, or they may be withdrawn at the end of each 6-months period by the investor.

A membership fee amounting to 2 per cent of the par value of each share of stock sold is placed in the association expense fund. Members who have subscribed for installment stock or fully paid stock may, at the end of one year, withdraw the amount standing to their credit on the books of the association upon 30 days' written notice. This includes all dividends. Monthly payments provide funds about as needed to make loans. The operating expenses of the association are limited to 3 per cent of the active assets.

Such an association imports first-class high-grade dairy cows and purebred sires

for sale to borrowers at approximately cost, or it will lend the money with which to purchase them on long-time easy payments. It not only lends money for the purchase of dairy stock, but also for the construction of barns, silos, and other buildings on dairy farms. When money is loaned for this purpose, dairy cows are taken as security.

Applicants for loans are required to show that they are at the time of making applications milking cows and disposing of the product in a satisfactory manner, that they have barn facilities for the cows to be purchased, that they have feed for them, and that they are generally qualified as dairymen and satisfactory borrowers. Having satisfied the association in these respects, the association will lend all the money for the purchase of the dairy cows, but requires the applicant to offer as additional security one-fourth as many cows as he proposed to purchase with the new money—that is, an applicant for the money to purchase eight cows must have at least two good cows unencumbered, which he offers as additional security at the time the loan is made.

Take, for example, the farmer who, having met the above qualifications, desires to borrow money for the purchase of six cows. At present prices high-grade cows of standard dairy breeds would be imported and furnished by the association at approximately \$100 per head, or they could be purchased by the applicant locally with the association's approval. The association would take a mortgage on the six cows purchased and on the two offered as additional security.

The \$600 would be loaned over a five-year period and the borrower would liquidate his loan by paying back to the association \$10 per month on the principal, interest at the rate of 6 per cent, calculated on the face of the loan for the entire time that it runs, which in this case amounts to \$3 per month. The borrower subscribes for six shares of stock, agreeing to pay upon the same \$1 per month per share. This investment in the stock of the association draws dividends just the same as the investment of every other stockholder draws dividends, but it is held by the association as additional security for the loan. Accordingly, it will be seen that the applicant's payments on the \$600 loan are as follows:

\$10 per month on the principal; \$3 per month interest; \$6 invested in Associa-

tion Class A stock, each month; \$19 total monthly payment.

The borrower also pays a small examination fee, and purchases insurance on the cows. During the early years of the association's operation a small premium is charged at the time loans are made.

Calculated upon the present prices of butterfat and the average returns from the better class of dairy cows, it would require approximately one-third of the cream check of the borrower to liquidate the loan and to make the borrower's investment in the stock of the association. If the association earns 8 per cent upon its invested capital, the sum accumulated to the credit of the borrower at the expiration of 60 months will amount to \$440.82. He has invested but \$360. His compound dividends amount to \$80.82. This money may then be withdrawn by the borrower who has paid his loan, or it may be left with the association to accumulate and mature. At maturity the borrower will be paid \$600 in cash. This plan makes it possible for a borrower of \$600 to take one-third of the returns from the cows he buys, pay off interest and principal, and accumulate also \$440.82 in cash in a period of 60 months.

The borrower's monthly payments rapidly decrease the principal of the loan. His investments in the stock of the association rapidly increase the security, so that at the end of three years it is no longer necessary to carry insurance upon the cows, because their total destruction would not result in a loss to the association. The monthly payment plan affords a quick check on the borrower. If he misses a payment, he is under suspicion; if he misses the second payment, he is investigated; if he misses a third, the association has the power of taking the security from him and placing it in the hands of a better manager.

The 1924 irrigation season of the Rio Grande project opened February 1 with the release of stored water from Elephant Butte Dam. In this connection the El Paso Herald believed that "the crop value prospect for 1924 is at least \$10,000,000 and may reach \$12,000,000. The irrigated acreage will be 12,000 to 15,000 acres greater than in 1923. The crop area will total fully 115,000 acres. Last year 100,000 acres were in cultivation.

WATER USERS RELIEVED BY BILL.

SECRETARY of the Interior Work has recommended to Congress that the annual cost of the main office of the Bureau of Reclamation at Washington, D. C., shall no longer be charged against the water users of the various reclamation projects.

In giving his approval to a bill for the reallocation of these overhead costs Secretary Work declared in a communication to Chairman Addison T. Smith, of the House Committee on Irrigation and Reclamation, that the discontinuance of this practice would lighten the burden the farmers on projects are now compelled to bear. He points out that under the reclamation law and the decision of the United States Supreme Court the Department of the Interior in the past has charged all general expenses of the Bureau of Reclamation, including that of the main office at Washington, to the costs made payable by contracts with the water users on the various projects. Continuing he says:

"The cost and expense of the Washington office from the beginning, in 1902, to June 30, 1923, aggregates \$3,558,881.80.

This sum, however, includes the amount charged to secondary projects, which amount can not be accurately separated from the aggregate without a somewhat burdensome computation, but is roughly estimated to be about \$70,000. The cost and expense of the Washington office for the calendar year 1923 was \$197,690.86.

"The Department of Agriculture is carried on for the benefit of farmers, the Department of Labor is conducted for the benefit of labor, and so it is with other divisions of the Government, yet the special beneficiaries do not pay the costs of the offices. The offices of the Bureau of Reclamation are, we believe, the only offices of the Government the full costs of which are required to be repaid by the particular class which receives special benefits therefrom, if we eliminate a few organizations like the Patent Office, which perform many small items of service for charges payable in advance.

"In the case of Federal irrigation projects, it appears to be the policy of the Government to supply the appropriations for their construction at a slow rate, with the result that the farmers under the

projects are compelled to carry a burden of overhead charges over an unnecessarily long period of time. This burden would be equitably lightened if the costs of the Washington office were hereafter charged to the Reclamation fund, but not to the water users on the projects. The latter would still be obligated to pay a considerable amount of future overhead cost on account of other field offices and all past overhead cost on account of all the offices of the bureau.

"Because of the matters above set forth, I am in favor of the enactment of the bill into law."

B. E. Hayden, formerly project manager on the Belle Fourche project, and now industrial agent with Field Commissioner Cannon, announces that after conference with the Great Western Sugar Co., the company has agreed to give the Belle Fourche sugar-beet growers the same favorable contract that is being offered in all Great Western territory.

The outlook is bright for high prices for hay on the Yuma project this year, owing to the winter drought in California.



A new homestead on the Shoshone project, Wyoming, being reclaimed from the desert.

CROP CONDITIONS ON THE PROJECTS.

THE following is a brief summary of crop conditions on the irrigation projects of the Department of the Interior, Bureau of Reclamation, at the end of January:

Yuma project, Arizona-California.—Cotton picking was about completed, and about 13,500 bales had been ginned at the end of the month. The price was still above 30 cents per pound. Last year 22,000 acres were planted to cotton, and it is planned to plant a still larger acreage in 1924. Alfalfa hay was selling as high as \$26 per ton. Indications pointed to a spring movement of alfalfa seed at fair prices.

Orland project, California.—Returns from the first six carloads of oranges shipped by the Orland Orange Growers' Association were disappointing. After deducting freight and local handling charges the net returns were about \$1 per box, or approximately the cost of production. The price of loose alfalfa increased from \$16 per ton to \$20, which held until the latter part of the month, when general rains brought the price down to \$15.

Grand Valley project, Colorado.—The price of alfalfa hay averaged \$12 per ton in the stack, which is a very satisfactory figure to the growers. Little crop movement was in progress.

Uncompahgre project, Colorado.—The movement of the potato crop to market was slow, and much of the stored crop will be held over for spring delivery. The crop census shows that the gross value of all crops produced in 1923 was about \$670,000 more than the value of the 1922 crop, or an increase in the average value per acre of 40 per cent over the 1922 value.

Boise project, Idaho.—Indications were that the local hay supply is in excess of requirements and that a large tonnage will remain unsold when the new crop comes on. A large quantity of grain and corn was being fed locally to sheep and hogs. Potatoes and apples were moving slowly. It was expected that there will later be a fair demand for potatoes of good quality. Prunes showed a loss to the growers, taking the project as a whole. There was a good demand for clover seed.

King Hill project, Idaho.—All but about 25 per cent of the hay had been sold at an average price of \$7 per ton. Owing to the mild winter and feed on the outside range, it appeared doubtful that the balance would be disposed of.

Minidoka project, Idaho.—Alfalfa in the stack sold for \$8 per ton; wheat at

\$1.35 per hundredweight; Russet potatoes at 75 cents per bushel; and Rurals at 45 cents.

Huntley project, Montana.—Nearly all of the hay crop was still being held, with practically no demand at any price.

Milk River project, Montana.—There was not much demand for hay. Grain prices improved, and one carload of shelled corn was shipped from Malta. Results from the experimental plots of sugar beets were satisfactory, the crop running as high as 15 tons per acre, with a sugar content of 18 per cent. Apparently the crop will be a commercial success if a factory is located in the vicinity.

Sun River project, Montana.—The hay market was poor, and about 65 per cent of the alfalfa crop remained unsold. The local market was good for all dairy and poultry products. Twenty-six carloads of agricultural products were shipped from the project during the month as compared with 34 in January, 1923.

North Platte project, Nebraska-Wyoming.—Little alfalfa hay remained unsold, but about 40 per cent of the potato crop was still on hand.

Newlands project, Nevada.—Practically all the surplus alfalfa hay in the Carson division was sold at very fair prices. The dry weather in California created a brisk demand for Nevada hay from districts not under quarantine for the alfalfa weevil.

Carlsbad project, New Mexico.—Cotton picking was practically completed, and about 9,200 bales had been picked at the close of the month. The price of good cotton averaged around 33 cents. Local sales of alfalfa were made at \$28 per ton.

PROJECT RETURNS 8,000 ACRES OF UNUSED LAND

The Riverton reclamation project in Wyoming has turned back to the public domain of the United States approximately 8,000 acres of land.

The area was originally withdrawn to be used in the construction of a reservoir to furnish water for the project, but after engineering plans were completed it was decided that the tract was not needed.

It is located near Dry Creek, a branch of the Wind River, and is broken and mountainous in character. The Interior Department recently opened it to homestead entry. No water for irrigation purposes, however, will be available from the Riverton project.

Plowing and other preparations for next season's crops were under way.

Rio Grande project, New Mexico-Texas.—A 10 to 20 per cent increase in the irrigable area during the coming season is anticipated, and the increase in the cotton acreage will probably be much larger than this.

Williston project, North Dakota.—Alfalfa hay was the only crop being marketed. There was a demand for the crop for dairy feed at an average price of \$12. Keen interest was shown in the plans for sugar-beet growing. The Williston project is included in the Montana-Dakota Beet Growers' Association, and the outlook is hopeful.

Umatilla project, Oregon.—The open winter affected the sales of hay, and none was disposed of by the Hay Growers' Association.

Klamath project, Oregon-California.—The amount of hay on the project farms was somewhat above the average for this time of the year, and there will probably be a fairly large carry over.

Belle Fourche project, South Dakota.—Crops were practically all marketed. The hay crop was shipped mostly to southern Wisconsin at \$12 to \$15 per ton f. o. b. Newell. The open winter has enabled the farmers to get well ahead with their general work, and they should be in good condition to start farm work in the spring. It is hoped that a considerable acreage will be planted to sugar beets, as the returns from that crop will amount to several times what can be secured from any other crop grown in the district.

Strawberry Valley project, Utah.—The prices of all farm products remained practically stationary during the month. The majority of the farmers were holding out for \$1 wheat, although some sales were made at 95 cents.

Okanogan project, Washington.—At the end of the month a few cars of apples remained to be shipped. The market was weak, and there was little hope for its recovery.

Yakima project, Washington.—Apples and potatoes were moving to market from storage. The market for apples picked up a little, but not enough to give the growers a profit, including storage charges. The farmers were engaged in pruning, plowing, and disking, as weather permitted.

Shoshone project, Wyoming.—The principal activity of the farmers consisted in hauling hay. About 3,000 tons of hay and 40 cars of potatoes remained to be marketed. Efforts were being made to increase the sugar-beet acreage, and thus hasten the erection of a sugar factory at Powell.

AN IMPROVED PUBLICATION.

(From Powell (Wyo.) Tribune.)

A MARKED improvement is noted and fully appreciated in the last two or three numbers of the RECLAMATION RECORD. It is not slighting the merit of the publication in past years to say that the periodical is now greatly improved. This is because it has become less technical and more "human," to use the much abused term in modern reclamation discussion, but a word that seems to fit in better with present reclamation reforms than any other in the Tribune editor's limited vocabulary.

Those who are running the RECLAMATION RECORD now have caught on to more nearly what is wanted in a reclamation publication. It is just a human sympathy with the hardships—not a pessimistic sympathy, but an optimistic, boosting, and helpful sympathy.

Not only has Secretary of the Interior Work "humanized" the Reclamation

WATER USER COMMENDS BUREAU PUBLICATION

H. E. Richardson, Pomona, Calif., a settler on the Newlands reclamation project, has written the Commissioner of the Reclamation Bureau as follows:

"Thanks to you, I got my January number (of the RECLAMATION RECORD) and will say I was never so anxious to get it as now. I like the stand the new officers are taking at Washington, and I have taken new hopes for the project."

Service, as he boasted he would strive to do, but he has, to be consistent, "humanized" the official publication of the Bureau of Reclamation.

The attitude of the publication has changed. It erstwhile strove to maintain a favorable aspect to all reclamation; it strove to educate the settlers to the idea that they must more energetically meet their contract obligations. Never was the service in any manner criticized in its columns. It should have maintained an attitude of constructive criticism of the manifold faults of the engineers as well as the settlers. It fell into the same old rut of thought with the rest of the service that could see no wrong except with the settlers.

Now the RECLAMATION RECORD does not hesitate to produce the figures to show that Federal reclamation is not in all ways successful; that the farmers on projects are having their time of it along with the agricultural industry generally. But the publication is in every way hopeful, and we believe it will be a great help in stimulating the settlers of the projects to more successful endeavors.

HOW ELECTRICITY HELPS THE MINIDOKA PROJECT

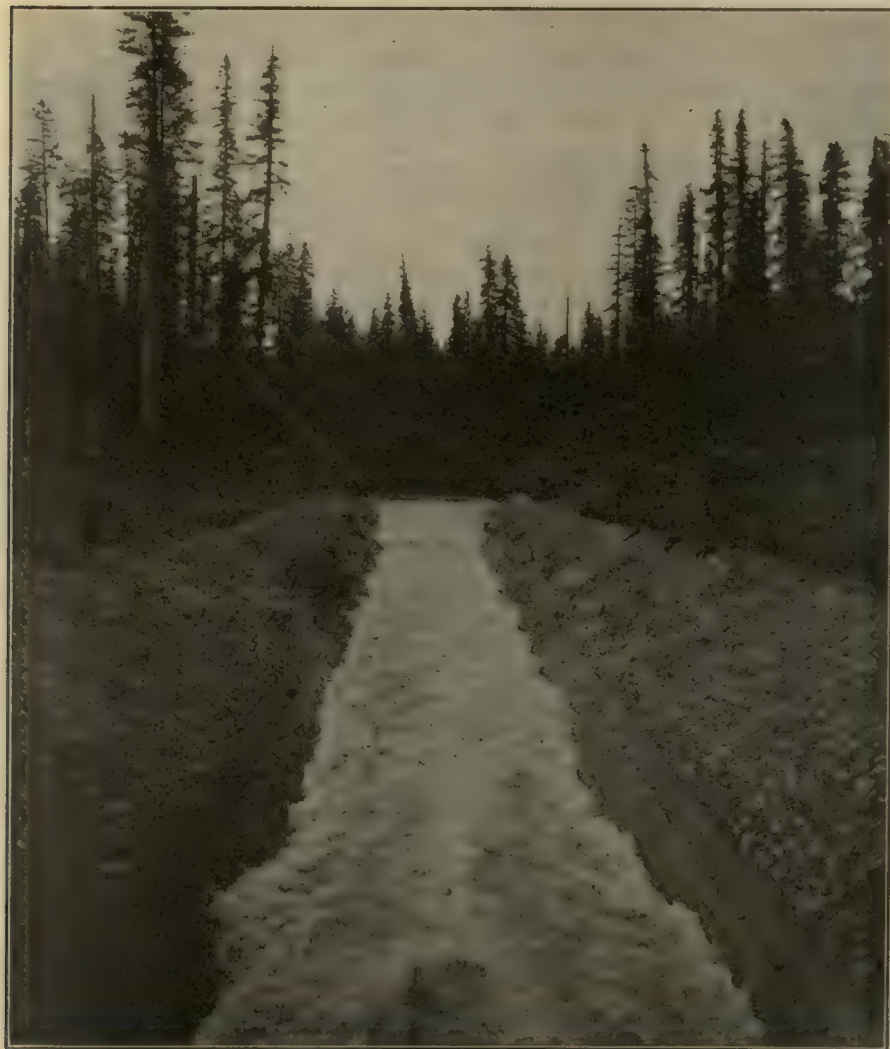
"Sixteen years ago a dreary desert of greasewood and sagebrush, the Minidoka project to-day is one of the most productive and prosperous agricultural areas in America," says Benjamin F. Spittler, owner of one of the prize ranches in the project.

"But mere putting of water on the land has not been responsible for the ideal conditions that exist. The thing that keeps Minidoka women happy and the boys satisfied is the bringing of cheap electricity to the farms.

"Through the cooperative factor introduced by the community distribution of electricity and the necessity of pulling together in the operation of the canal systems, residents are frequently brought together in a business way, social development follows, and the building up of a community spirit is the result.

"In addition to the 25 mutual electric companies on the project, distributing electricity to 1,200 farmers and owned and managed by the farmers, we have co-operative cheese factories, cold storage plants, dairy and hog associations, and many other organizations. And we have developed the best school system in the State.

"We have completely done away with the chief bane of the country—isolation, loneliness, and drudgery. Country life as we live it is all-sufficient—therefore satisfying."



Outlet of Kachess dam, Yakima project, Washington.

IRRIGATED PASTURES BRING GOOD RETURNS ON PROJECTS

Land unfit for the production of other crops can frequently be used to advantage for pastures, but a more productive soil is necessary to secure a high carrying capacity, which under favorable conditions will run as high as two cows per acre.



Cows on mixed grass pasture at the Huntley, Montana, Experiment Farm. The carrying capacity of this pasture was at the average rate of 1.75 cows per acre over a three-year period. On another pasture seeded to the same mixture, but top-dressed each year with manure, the average carrying capacity was 2.13 cows per acre.

THAT returns from irrigated pastures compare very favorably with returns from other crops is indicated in results of experiments extending over a period of ten years at the Huntley, Montana, Experiment Farm, and is supported by experiences of farmers on the Huntley Reclamation Project, says Dan Hansen, farm superintendent. For dairy cattle, such pastures, when established on good land capable of producing high yields of other crops, have been shown to have a carrying capacity of as high as two cows per acre over a grazing season of slightly more than four and one-half months.

The results of these experiments should be applicable to a large part of the irrigated sections of eastern Montana and northern Wyoming where climatic and soil conditions are similar to those of the Yellowstone valley.

In comparing returns of pastures with returns from other crops, it is usual to consider the hay replacement value of the pasture. A mature Holstein cow will consume from 1,200 to 1,500 pounds of alfalfa hay per month so that a pasture with a carrying capacity of two cows per acre would replace about 6 tons of hay. This same land would probably produce a total of 5 tons of alfalfa hay in a season. Since it is usually necessary to supplement the pasture with small feeds of hay during the latter part of the pasture season, which, in the case of the experiments referred to, amounted to from 1,000 to 1,200 pounds of hay for each acre of pasture, it would appear that the returns from the pasture or the hay crop might be about equal. The advantage of the

pasture, however, is soon apparent when it is considered that in addition to increasing the production of the cows, the work of harvesting is saved and the labor of caring for the stock is lessened during the summer months when the farmer is busiest.

In the experiments referred to, tests were made of three pasture mixtures selected from the results of earlier tests as being probably best suited to conditions. These mixtures were seeded by each of four methods to determine proper methods and time of seeding and after the pastures were well established they were used in a test of comparative carrying capacity for dairy cattle.

These mixtures, and the rate of seeding of each of the grasses in the mixture, were as follows:

Pasture mixture.	Rate per acre of seeding (pounds).		
	Mixture No. 1.	Mixture No. 2.	Mixture No. 3.
Awnless brome grass.....	2	2	None.
Orchard grass.....	5	5	5
Tall fescue.....	8	3	3
Perennial rye grass.....	3	3	None.
Kentucky blue grass.....	4	4	4
White clover.....	2	None.	2
Alsika clover.....	2	None.	2
Total.....	21	17	16

In a three years' carrying capacity test, pasture mixture No. 1 had an average carrying capacity at the rate of 1.75 cows per acre over a pasture period of 141 days; mixture No. 2 carried the same average number of cows daily for an average season of 137

days; while mixture No. 3 carried 1.84 cows daily during a season of 141 days. The average production of cows on pasture No. 1 was 3,578 pounds of milk and 128 pounds of butterfat; of cows on pasture No. 2, 3,426 pounds milk and 122 pounds butterfat; and of cows on pasture No. 3, 2,715 pounds of milk and 89 pounds of butterfat per acre. In considering the production from cows while on pasture, it should be mentioned that it was frequently necessary to include in each group cows that were dry or that were well advanced in lactation period.

The pasture season began during the first part of May and ended about October 1. Pastures made the best growth during the first two months of the season and carried during this time from three to four cows per acre. During the month of August it became necessary to reduce the number of cows on each pasture, while during the last month it was found necessary to supplement the pasture with a small feed daily of alfalfa hay. The cows were removed from the pastures during temporary periods of stormy weather or to allow pastures to recover from too close grazing. The total time that cows were off pastures for these reasons averaged about 10 days during the season. During this time they were also fed alfalfa hay. The total amount of alfalfa hay that was fed averaged about 1,000 pounds per acre of pasture. Irrigation was applied to the pastures in periods of from 10 days to 3 weeks, depending upon conditions of rainfall and pasture growth.

(Continued on page 44.)

PRIVATE DISTRICT WANTS EXTENSION

Representatives of a bondholders committee from New York of the Tri-State Land Co. and the Farmers Irrigation District of Nebraska have been given a hearing at the Interior Department to consider the question of readjusting the financial affairs of the district.

The Farmers Irrigation District is a private reclamation enterprise with a bonded indebtedness of \$1,902,000 located near Scotts Bluff, Nebr., and has been purchasing water from the United States through storage created by the Pathfinder Dam on the North Platte project.

The district at the present time owes the Government approximately \$500,000 for water already delivered, and the representatives at to-day's hearing asked for extension of time of these payments. The bondholders committee also agreed to an extension of time for the payment of interest and the bonds by the district providing the Government would agree to put off the payment of its obligation. A plan for the Interior Department

CHERRIES LOOK GOOD TO FLATHEAD GROWERS

P. P. Johnson, who formerly lived in western Washington and is familiar with the fruit industry, believes that the growing of sweet cherries is destined to put the Flathead (Indian) project, in Montana, on the map in the next few years.

On Flathead Lake first-class cherry land can be bought for \$50 to \$100 per acre. Sweet cherries can be brought into bearing in three or four years and during that time strawberries and other small fruit can be grown profitably. The demand for cherries is greater than the supply, and if the fruit can be grown in sufficient quantities, a larger market in car-load lots can be reached.

through the Bureau of Reclamation to take over the entire management and operation of the district was proposed.

Final decision on the question presented at the hearing was taken under advisement and will be announced later.

FARMERS SOLVE FARM MANAGEMENT PROBLEM

Thousands of farmers in all parts of the country are reorganizing their business to bring about a better balance between their crop and livestock enterprises. Through the farm management extension work of the Department of Agriculture livestock growers particularly are appreciating the importance of producing on the farm a properly balanced livestock ration instead of purchasing feeds in the open market. Farmers are also becoming more self-sufficient in the matter of food for the family, whereas formerly much of the food consumed has been purchased.

The basis of the reorganization program is the keeping of simple farm accounts that reveal at once the weak spots in the business, such as poor crop and livestock combinations, waste motion, and inefficient use of labor.

BRIDGE GRAFTING FOR FRUIT TREES

There are few fruit growers who have not suffered loss because of the girdling of their trees by mice, rabbits, or other rodents. Pear growers are familiar with the encroachments made by blight when that disease attacks the trunks of the trees and rapidly spreads until it completely girdles them. Girdling by this means is just as certain to kill the trees as is girdling by the removal of the bark. Where injury of this character occurs, it is usually possible to save the trees with comparatively little expense by bridge grafting.

Although the various steps in the operation must be done with care and precision, and with regard to details, there is no reason why anyone who is sufficiently skillful in the use of his hands to fit together closely two pieces of wood should not be successful in making bridge grafts. No one who has a girdled tree need hesitate to employ bridge grafting in saving it because of the intricacies or difficulties of making the graft.

In making a bridge graft the injured area is "bridged" by a scion or scions; the ends of which unite with the uninjured parts above and below the wound in such a manner that a connection between the tissues is established. The process is fully described in Farmers Bulletin No. 1369 of the U. S. Department of Agriculture.

Negotiations were completed recently to purchase a tract of land about 1 mile south of Carlsbad for a new cotton gin to be erected before next season's operations.

IRRIGATED PASTURES BRING GOOD RETURNS

(Continued from page 43.)

Another experiment was conducted to determine the effect of top-dressing pastures with manure. A 1-acre pasture that was seeded to pasture mixture No. 1 described above was given a top-dressing of 12 loads of manure each year. The carrying capacity of the pasture over a five-year period was at the rate of 2.13 cows per acre over an average grazing season of 137 days, which was a very marked increase over the carrying capacity of pastures that were not top-dressed. The cows produced while on this pasture an average of 7,117 pounds of milk and 281.4 pounds of butterfat each year. During the course of the experiment, cows of high production were used. Each year as the grazing season advanced it was necessary to supplement the pasture with small feeds daily of alfalfa hay. The average amount of hay fed each year was 1,202 pounds per acre of pasture.

A mixture recommended for use on well-drained soils is as follows: Smooth brome grass, 3 to 4 pounds; Kentucky blue grass, 4 to 6 pounds; orchard grass, 4 to 6 pounds; tall or meadow fescue, 3 to 4 pounds; and white and alsike clover, 1 to 2 pounds each per acre. This makes a total of from 16 to 24 pounds of seed per acre.

The success of pastures depends largely upon the care given during the first season. Proper irrigation is perhaps the

most important factor in starting pastures, and it is very important that the surface soil be well supplied with moisture at all times and frequent light irrigations will be necessary. Where a nurse crop is grown, this crop should be removed as soon as possible after it is harvested so that irrigation can be applied. A loss of stand is perhaps more likely to occur at this stage than at any other time, when the ground is allowed to dry to mature and harvest the grain crop.

Pastures should be divided for alternate grazing and irrigation to make it possible to apply frequent light irrigations, since most grasses are shallow rooted and can not make use of water to any great depth in the soil. It is also important to not allow pastures to be grazed too closely, since the plants require a certain amount of leaf surface for maximum growth efficiency, and production will be greater where the grasses have a growth of not less than 5 or 6 inches.

To maintain pastures in good condition and secure maximum returns, it is desirable to top-dress them with manure at the rate of 8 to 10 loads per acre. The manure should be applied after the close of the pasture season and the pastures should be harrowed before the next season to distribute the manure evenly and mix it with the soil.

IRRIGATION LAW DECISIONS

A WATER right in the State of Washington is "real property" appurtenant to and passing with a conveyance of the land. (*Tedford v. Wenatchee Reclamation Dist.* (Wash.), 221 Pac. 328.)

Under the constitution of Colorado, article 12, section 1, a director of an irrigation district is a public official, and may continue to act until his successor is duly qualified. (*East Denver Municipal Irr. Dist. v. Doherty* (Colo.), 293 Fed. 804.)

The organization of an irrigation district in Utah will not be held invalid unless it clearly appears that some substantial provision of the statute has been omitted or disregarded. Mere irregularities in the organization of the district do not affect its validity. (*State ex rel. Cluff, Atty. Gen., v. Weber County Irr. Dist.* (Utah), 218 Pac. 732.)

A water master upon a stream in Idaho, the waters of which have been decreed, must distribute the waters of said stream in compliance with such decree, and, in the absence of a modification thereof, can not be compelled by mandatory injunction to do otherwise. (*Daniels v. Adair* (Idaho), 220 Pac. 107.)

In Oregon water flowing underground in a constant stream in a known and well-defined natural channel, however small, but reasonably ascertainable from the surface, without excavation, constitutes a "watercourse," and not "percolating water." Diversion of waters of an underground stream is governed by the law applicable to surface streams, and not that of percolating waters. (*Hayes v. Adams* (Oreg.), 218 Pac. 933.)

Where a settler has entered upon the Fort Hall Indian reservation in Idaho under a valid claim of right of possession, and has initiated an appropriation of water by the diversion thereof upon a tract of land in the reservation, and has put such water to a beneficial use during the entire period of his occupancy and finally acquires the fee-simple title to the land, his right to the use of the water dates from the time when he in good faith diverted and applied it to a beneficial use. (*Cohn v. Sorenson* (Idaho), 219 Pac. 1059.)

A decree adjudging that an irrigation district in Oregon had been established according to law and was entitled to issue and sell bonds, in a proceeding under Oregon Laws, sections 7358-7360, is conclusive against an attack on the organization of the district because notice of the petition was not given by petitioners themselves as required by Oregon Laws, section 7305, but by the county clerk. (*Weber v. Jordan Valley Irr. Dist.* (Oreg.), 220 Pac. 146.)

An oil-refining company in Utah can purchase from the owners of lots in an artesian district their rights to the water owned by them and conduct the water to its oil refinery beyond the limits of such district, provided that in so doing it does not interfere with the right of other owners to receive water in proportion to their surface area, since the purchase and use of such water does not injure the rights of such other owners. (*Glover v. Utah Oil Refining Co.* (Utah), 218 Pac. 955.)

BLACK CANYON DAM MOVIE PLOT SCENE

THE Black Canyon Dam now under construction by the Government on the Boise reclamation project in Idaho will be the scene of a thrilling moving picture, providing a Los Angeles company desiring to utilize the works as a background for a plot of one of its scenarios complies with regulations laid down by the Bureau of Reclamation, of the Interior Department.

An application received by the Bureau of Reclamation for the snapping of a series of pictures at the dam site while construction is being prosecuted was received today and met with approval, providing the concern taking the picture gave a \$5,000 bond not to interfere with the progress of the work, which is being rushed at the present time.

The motion-picture production, the application stated, does not provide for a large cast on the structure itself, but at least three of the principal actors in the play would have to pose on the dam while the camera was reeling off many films of them.

Under Utah Laws 1919, chapter 68, as amended by Laws 1921, chapter 73, a tax levied against property in an irrigation district to meet its expenses and pay interest and sinking fund is controlled by the benefits received, and a landowner can not be assessed for a pro rata share of delinquencies of other owners in previous years except to the extent of 15 per cent, which the county commissioners are authorized to add to the levy for that purpose. (*Nelson v. Board of Com'rs of Davis County* (Utah), 218 Pac. 952.)

A water right is not an inseparable appurtenance to land in the State of Montana but may be sold with or separate and apart from the land. A water right appurtenant to land is conveyed in a grant of the realty, unless reserved from the operation of the grant, but where the water right intended to be conveyed with the land is stated in express terms the grantee takes only that which is expressly conveyed, in such cases the grantor reserving what he does not convey. (*Kofoed v. Bray* (Mont.), 220 Pac. 532.)

An appropriation of water is limited to its beneficial use, to needs present and prospective, if coupled with a bona fide intention to use the water, and where the appropriator's needs and facilities are equal, they measure the extent of his appropriation, and where one appropriates water first from one stream and then from another, and either is sufficient, he can not thereafter hold both rights against subsequent appropriators, but must elect to hold either one or the other. Where one has a right to use waters from one creek, fails to use them, and relies for his supply on another creek, such failure to use them constitutes an "abandonment." (*O'Shea v. Doty* (Mont.), 218 Pac. 658.)

Jurisdiction to examine and adjudge as to the regularity and legality of the proceedings of an Oregon irrigation district to authorize the issue and sale of bonds is acquired in view of the confirmation act of 1919 by a petition being duly filed, by notice of the proceedings being given by direction of the judge of the circuit court who fixes the time and place of the hearing, and the notice being signed by the clerk of the court. Proceedings under this act being in rem, the landowners affected are bound thereby if there has been a due publication of the notice in accordance with the statute, notwithstanding there has been no personal service upon them. (*Harney Valley*) Irrigation District *v. Bolton* (Oregon), 221 Pac. 171.)

TO MARKET SURPLUS HAY FEED LAMBS ON ALFALFA

In order to show what can be reasonably expected of lamb fattening as a means of marketing surplus alfalfa hay and the manner in which the largest possible amount of alfalfa hay may be used in the most efficient manner, Mr. H. K. Dean, superintendent of the experiment station on the Umatilla project, Oregon, during the winter of 1922-23 undertook a series of tests, the results of which were published in an Oregon Experiment Station bulletin and made available to farmers interested. Suggestions were made on buying feeder lambs, the equipment needed, feeding, and marketing. A financial discussion was included.

The following practical points were developed:

The ideal feeder lamb is a thrifty, healthy lamb, weighing not less than 50 and not more than 60 pounds.

Good thrifty lambs will gain one-third pound per day and will be fat in from 40 to 90 days.

It requires 300 pounds of grain and 900 pounds of alfalfa to put on 100 pounds of gain with fattening lambs.

The standard ration on the alfalfa farms is 1 pound of whole grain and 3 pounds of alfalfa.

One ton of grain is worth 3 tons of hay for fattening purposes.

Lambs may be fattened on as little as $\frac{3}{4}$ pound of grain per day, when grain is expensive, or as much as $1\frac{1}{2}$ pounds per day when grain is cheap.

Grains are best fed without grinding and hay without chopping.

The possibilities presented by the experiments at the station influenced three of the project farmers to secure three carloads of lambs in the fall of 1923. Those purchasing lambs were E. L. Jackson, one carload; C. M. Jackson, one carload; Swam and Stone, one carload. The experiment station is again

WHY NOT HAVE MORE CANNING FACTORIES?

From the Boise project, Idaho, comes the story of how a canning factory can be operated and managed successfully to the general benefit of the producers, as told in a recent issue of the Evening Capital News.

The canning factory at Payette recently completed its season's run with the result that 18 weeks were devoted to the canning of 32,000 cases of vegetables and fruits. There were 80 people employed and \$30,000 was spent in wages. The growers received approximately \$16,000 for their produce. Peas, cherries, tomatoes, corn, peaches, pears, and apples were canned. The entire output was sold at a profit to the operators.

What Payette has done every city and town in the Boise Valley can do—establish canning factory industries which will take care of and condense to a marketable stage some of the surplus produce from the wonderfully fertile soil of this section. The turning into a condensed form much of the produce raised in southern and western Idaho is one of the solutions to the farm problems of the day. The Boise project ought to become a hive of industry where that produce not sold in the fresh stage may be condensed into a form that can be held over for favorable markets or marketed immediately after it is manufactured.

Does not this apply with equal force to conditions on practically all the projects? Think it over.

conducting tests with one carload of lambs.

Lamb feeding on the Umatilla project is still more or less in an experimental stage. Although the lambs now on feed are making satisfactory gains, the outcome of course depends upon the spread between the price of feeders in the fall and fat lambs in the spring.

The lambs from this district will be sold on the Portland and Seattle markets.

ATTEND THE INCUBATOR AND PRODUCE MORE EGGS

The hen is the best incubator for most farmers, but incubators may be used to advantage on many farms. February, March, and April are the best months for hatching. Early hatching is essential for the best results.

For hatching, select uniformly good-sized eggs from fowls kept on free range or having good yards.

Treat the hen for lice before setting her. Place from 10 to 13 eggs under a hen in cold weather and from 13 to 15 in warm weather.

Sitting hens need careful, regular attention.

All eggs should be tested by the seventh day, which often makes it possible to reset some of the hens. Test the eggs again on the fourteenth day.

A well-ventilated cellar is the best place to operate an incubator. The machine should be operated according to the manufacturer's directions. See that the incubator is running steadily at the desired temperature before filling it with eggs. Do not add eggs to a machine during incubation.

Turn the eggs twice daily after the second and through the eighteenth day. Be sure to turn the eggs before caring for the lamp, so that no kerosene will get on the eggs through handling.

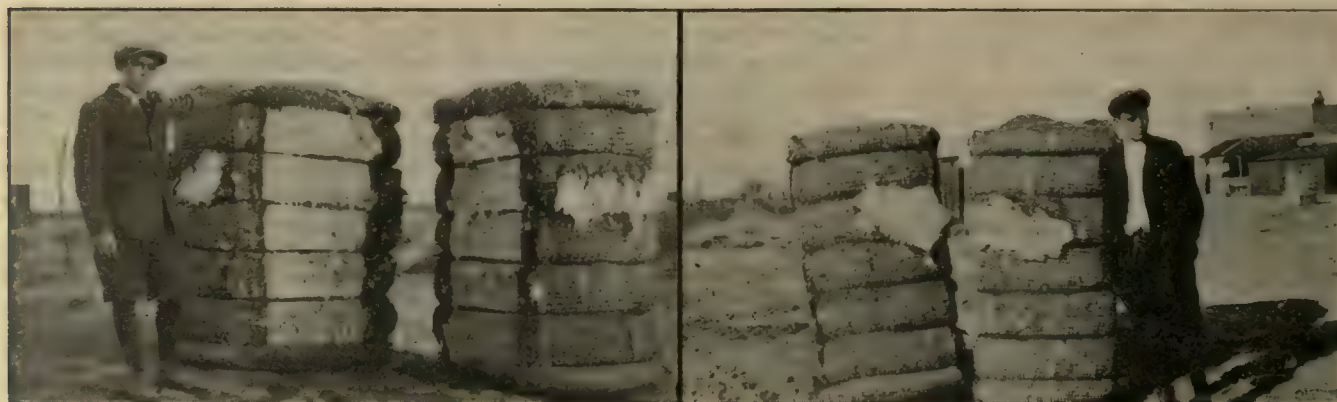
Cool the eggs once daily, according to the weather, from the seventh through the eighteenth day.

Attend to the machine carefully at regular hours. Keep the lamp and wick clean.

Do not open the machine after the eighteenth day until the chickens are hatched.

For further details, see Farmers' Bulletin No. 1363 of the Department of Agriculture.

Collections from the projects for the first six months of the last fiscal years are as follows: 1920, \$2,107,000; 1921, \$1,701,000; 1922, \$1,598,000; 1923, \$2,466,000; and 1924, \$3,366,000.



Two cotton-club boys on the Rio Grande project, New Mexico-Texas, who are making records in the production of this crop.

WHAT TYPE OF FARMING SHOULD YOU FOLLOW?

To continue to grow cotton or to change to corn and hogs, to grow wheat and oats or to go into dairying, or to change to any other type of farming which may at the time seem to offer more profitable returns than the prevailing type, are questions ever present in great farming regions, and which are the subject often of earnest consideration in times of agricultural depression. In attempting to make such changes serious errors are almost certain to be made unless those who are directing the movement have a thorough understanding of the forces which control the types of farming adapted to the different regions.

It is possible, at least in a general way, to determine what farm enterprises are adapted to a region by studying the physical, biological, and economic conditions prevailing there, and the adaptability of various enterprises to these conditions.

Physical factors, such as soil and climatic conditions, play an important part in the type of farming adaptable to a given region. Temperature limits the northern distribution of cotton, southern distribution of wheat, and northern distribution of corn. Rainfall and length of growing season are other important factors the effects of which are very apparent in our agriculture.

Under biological factors might be mentioned the effect of the boll weevil in reducing the cotton acreage near the Gulf and Atlantic coasts. The Hessian fly has changed the date of seeding winter wheat and has probably reduced the acreage of this crop in some localities. Many other cases may be cited in which insect pests and fungous diseases are determining factors.

Among economic factors are cost of transportation and distance from market. Another important one is competition with regions which can produce more cheaply.

Farmers' Bulletin No. 1289, Distribution of Types of Farming in the United States, aims to make clear the part these fundamental factors play in determining the possibility of establishing on a profitable basis a new or different type of farming, and to show that the kind of farming which prevails is based on them, rather than on the desires or whims of the farmer.

Engineer C. C. Fisher has been selected to make an investigation of irrigation possibilities of a project on St. Croix Island in the Virgin Island group at the request of the Navy Department. Mr. Fisher sailed in February, and his work on the San Juan Basin investigations in southern Colorado will be suspended temporarily during the time required for the St. Croix investigations.

A WELL PLANNED BARN SAVES TIME AND LABOR

The plan, construction, and equipment of a dairy barn should receive careful consideration and study in order that the building may best serve its purpose, and also to avoid as far as possible having to make expensive alterations which otherwise might become desirable or necessary.

A well-planned and equipped barn saves time and labor for the farmer, and provides comfortable quarters for the cows, whereas the poorly planned barn is a daily source of annoyance and of wasted time and energy. It is important, then, that dairymen become familiar with the best principles of barn construction and the most satisfactory types of equipment before building or remodeling their barns.

INCREASE POPULATION AND DIVERSIFY CROPS

After visiting practically all the Government irrigation projects at the request of Secretary Work for the purpose of learning first hand, as far as possible, why the people on these projects are not prospering as they should and what the Bureau of Reclamation may do to better conditions, Miles Cannon, field commissioner, has reached the following conclusions:

"My investigations and study have convinced me that two main things must take place on our projects before a reasonable measure of success will be attained: (a) Increase the farming population by from 50 to 200 per cent, and (b) secure better diversification of crops and the consumption of same on the farm. Farmers must come to think of their farms as permanent homes, to be improved and beautified and eventually handed down to their children, instead of being merely a temporary abode to be exploited and sold at the first opportunity."

As the art of irrigation advances, less water will be applied to the soil, better cultivation will be practiced, the duty of water will increase, and the effective flow of the streams, in terms of acres to be served, will increase correspondingly.

Careful arrangement of the farmstead and intelligent planning of the farm buildings is good business under any circumstances, but it is especially important when capital is limited and must be made to go a long way.

DAIRY ADVANTAGES ON NEWLANDS PROJECT

There is perhaps no other agricultural pursuit that is better adapted to the Newlands project than the dairy industry. This has been generally appreciated by a large number of dairymen who have been persistent in building up efficient dairy herds. Cheap, abundant, inexpensive, and nutritious feed, together with a constant mild climate with a predominance of sunny days, has proven to local dairymen that for uniform cheap production the Newlands project has the advantage over most other localities. The results secured from feeding dairy cattle on an unlimited alfalfa hay ration, as is practiced locally, have invariably been a surprise to dairymen coming here from other sections. Local dairymen have not felt it necessary to supplement alfalfa hay for feeding dairy cattle. Alfalfa hay has generally been such a cheap feed as compared with the supplements available that the use of the latter has been considered not to be economical.

Dairy cattle in full flow of milk consume on an average 30 pounds of alfalfa hay per day for Jerseys and 35 to 40 pounds per day for Holstein cattle.

Owing to the peculiarly favorable climatic conditions, particularly the extremely light precipitation and the large proportion of clear days, the expense of housing stock on the farms is reduced to a minimum and the sheltering of alfalfa hay is unknown. For the convenience of handling the milking cows, sheds or platforms with stanchions are used. On some farms open sheds are provided for sheltering cattle from an occasional stormy day in the winter and to serve also as a shade in the summer. It is a general practice to stack the alfalfa adjacent to the feeding corrals and throw the hay from the large stacks into the feeding racks, thus reducing the item of labor in this connection to the minimum. The use of open corrals throughout the year eliminates the drudgery of daily cleaning out the barns. The elimination of much of the labor cost in caring for the herd, together with an abundance of cheap and nutritious feed, when accompanied by a uniformly mild climate, makes this section admirably adapted for dairying.

Farming to-day is undergoing necessary readjustments. Farmers who study the situation and alter their plans to suit the circumstances will be the first to cut their losses on crops that for any reason have become unprofitable, and the first to get their farms back on a paying basis.

POTATO CROP SHOULD BE INCREASED BY SPRAYING

With few exceptions large gains in yield have been obtained by spraying potatoes as a protection against insect pests and diseases. During a 10-year period, at different experiment stations in New York State, an average gain of 60 bushels an acre was obtained. At the Vermont station, during a 20-year period, which involved all possible seasonal variations, an average gain of 105 bushels an acre, or 64 per cent over the unsprayed, resulted.

In addition, records taken from a business point of view on a series of experiments of a 9-year duration conducted by farmers under the direction of the New York State experiment station show large gains. The average cost of spraying, including materials, labor, and wear and tear on machinery was \$4.74 per acre. The 9-year average increase in yield due to spraying was 36 bushels per acre, making a net profit of \$14.43 per acre. When these experiments were conducted the cost of materials was less than at the time the report was written, but the increased product warrants an increased expenditure.

VALUE OF FERTILIZER.

Mr. F. G. Noble, farm superintendent of the Yuma Experiment Farm, Bard, Calif., on the Yuma irrigation project, is giving the project water users an interesting demonstration. Apparently the farmers did not appreciate fully what was going on at the experiment farm, so it was suggested that it might be an excellent idea to demonstrate the use of some of the fertilizers adjacent to main traveled roads and to mark the experiment plots with signs that could be read easily by the passing public, with the check plot immediately beside the experiment plot.

This suggestion was carried out with experiment plots in alfalfa and in alfalfa seed, using different fertilizers on sandy soils. Where acid phosphates were used the results were readily apparent, and every passing farmer could see these for himself, read the signs telling what was being done, and draw his own conclusions.

The idea might very well be extended to other crop experiments, for there can be no doubt of the value of these ocular demonstrations, assisted by easily-read signs, impressing their message daily on the mind of the public.

Sugar beets are not only one of the best cash crops grown on the projects for the sugar content but they contribute largely to the success of the dairy because of the feeding value of the by-products.

GRAVEL SCREENING DONE EFFICIENTLY AT TIETON

At Rimrook, Wash., where the Department of the Interior is constructing an enormous earth and rock fill dam with concrete core, to supplement the supply of storage water for the Yakima project, an interesting feature of the construction layout is the gravel screening plant. Advantage was taken of the topography by locating the plant surmounted by a high cableway tower at the center of a semicircular arc described by the river in its course. The gravel is picked up from the bed and edge of the stream by a bucket suspended and operated along a cableway, one end of which is at the center of the tower and the other end is attached to a tree across the river and can be moved whenever conditions warrant. The gravel is dumped into a hopper at the top of the tower and is screened and washed in the same process as it descends by gravity.

Mr. F. T. Crowe, the construction engineer who has had much experience in this line, states that this is the most efficient and satisfactory gravel plant he has ever operated. It will excavate, screen, crush, and wash approximately 400 yards per 8-hour shift with a crew of three men; 4-yard cars can be loaded from under the bins at the rate of one per minute by the brakeman on the train that conveys the material to the mixer.

One of the advantages is that every considerable rise in the river refills the excavated portion of the gravel beds, so that the plant might be operated indefinitely and will, in fact, be operated several years from the same position.

RABBITS

A local paper claims that at least 4,000 families in El Paso, Rio Grande project, Texas, are raising rabbits in their back yards for meat. Meat so produced costs about 10 cents per pound instead of the market price of 40 or 50 cents. Incidentally the sale of the hides for fur swells the income if judiciously handled. It is claimed that seven Himalayan rabbit hides were made into a garment that the Southern California Coney Fur Club sold for \$1,850. This fancy price was secured because the garment passed easily for ermine.

It is always desirable to have shipments of poultry arrive on the market early enough to be weighed the same day. Actual shrinkage on poultry shipments varies according to the condition of the birds, the weather, and the length of the journey.

THE EELWORM DISEASE A MENACE TO ALFALFA

The alfalfa eelworm disease is causing considerable damage to alfalfa fields and consequently serious losses. The pest is proving to be extremely dangerous and deserves prompt and aggressive measures to check it before it becomes widespread.

The disease appears in "sick spots" in the field caused by a thinning out of the plants, leaving a poor stand of dwarfed, yellowed, and distorted plants. Stems are swollen at the base and brown in color. They are often brittle and easily broken off at the base; in fact, this brittleness is one of the means of easy diagnosis. The spring of the year is the best time to look for the disease, although the typical symptoms can be recognized at any time. Much of the spread of the disease appears to take place in the fall, winter, and early spring.

The organisms are spread in various ways—by irrigation water, infested hay, farm implements, wind, and birds. Prevention of the spread in any way possible is to be urged and is worth infinitely more than "a ton of cure." Eradication of the disease by plowing up infected fields and turning into other crops for a period of three years is the safest way.

A further reason for prompt and aggressive action in dealing with this disease is the fact that the organism may pass over and affect other crops. In an experimental way, red, white, and alsike clovers, buckwheat, rye, English pea, turnip, and even potatoes have been attacked and definitely injured by the alfalfa eelworm. The entire list of possible hosts has not yet been determined.

TESTING ASSOCIATION FINISHES FIRST YEAR

The Newlands Project Herd Testing Association finished the last month of their first year's work with more herds and more cows on test than when the association was started and more than the average number of cows for the entire year. This shows a good healthy sentiment for progressive dairy methods and argues well for the permanency of herd-testing work as an established institution among the dairymen of the Newlands project.

A demonstration train operated jointly by the Santa Fe Railroad and the New Mexico College of Agriculture stopped at Rio Grande project towns recently. The train carried farm exhibits and speakers on the subject of diversified farming.

ADMINISTRATIVE ORGANIZATION OF THE BUREAU OF RECLAMATION.

DEPARTMENT OF THE INTERIOR.

HON. HUBERT WORK, Secretary of the Interior.
EDWARD C. FINNEY, First Assistant Secretary.
FRANCIS M. GOODWIN, Assistant Secretary.
JOHN H. EDWARDS, Solicitor for the Interior Department.
EDERT K. BURLEW, Administrative Assistant to the Secretary.
JOHN H. MCNEELY, Assistant to the Secretary.
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WASHINGTON, D. C.

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Miles Cannon, field commissioner; H. L. Holgate, assistant field commissioner; B. E. Hayden, industrial agent; C. R. Trowbridge, chief inspector.

J. R. Ummel, office manager; A. McD. Brooks, purchasing agent; Harry Caden, fiscal agent.

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Boise Project, Black Canyon Dam.—Walter Ward, construction engineer, Emmett, Idaho; M. J. Gorman, chief clerk, T. W. Hause, fiscal agent.

Carlsbad Project.—L. E. Foster, project manager; Carlsbad, N. Mex.; V. L. Minter, chief clerk and fiscal agent.

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Lower Yellowstone Project.—H. A. Parker, project manager, Savage, Mont.; E. R. Scheppelmann, chief clerk.

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Okanogan Project.—Calvin Casteel, project manager, Okanogan, Wash.; W. D. Funk, chief clerk and fiscal agent.

Orland Project.—R. C. E. Weber, project manager, Orland, Calif.; E. T. Eriksen, engineer; C. H. Lillingston, chief clerk and fiscal agent.

Rio Grande Project.—L. M. Lawson, project manager, El Paso, Tex.; C. A. Peavey, chief clerk; L. S. Kennicott, fiscal agent.

Riverton Project.—H. D. Comstock, project manager, Riverton, Wyo.; L. H. Mitchell, engineer; R. B. Smith, chief clerk; Henry Berryhill, fiscal agent.

St. Mary Storage Division.—R. M. Snell, project manager, Browning, Mont.; F. H. Shiner, chief clerk and fiscal agent.

Salt River Project.—Being operated by the Salt River Valley Water Users' Association; C. C. Cragin, general superintendent and chief engineer, Phoenix, Ariz.

Shoshone Project.—J. S. Longwell, project manager, Powell, Wyo.; J. R. Iakisch, engineer; C. M. Jump, superintendent of irrigation; W. F. Sha, chief clerk; Mrs. O. C. Knights, fiscal agent.

Strawberry Valley Project.—W. L. Whittemore, project manager, Provo, Utah; H. R. Pasewalk, chief clerk; W. C. Berger, fiscal agent.

Sun River Project.—G. O. Sanford, project manager, Great Falls, Mont.; H. W. Johnson, chief clerk; F. C. Lewis, fiscal agent; G. A. Benjamin, irrigation manager, Fairfield, Mont.

Umatilla Project.—H. M. Schilling, project manager, Hermiston, Oreg.; G. C. Patterson, chief clerk; Miss M. G. Valentine, fiscal agent.

Umatilla Project, McKay Dam.—R. M. Conne, superintendent of construction; Ralph Lowry, engineer in charge, McKay Dam, Oreg.; C. B. Funk, chief clerk; W. S. Gillogly, fiscal agent.

Uncompahgre Project.—L. J. Foster, project manager, Montrose, Colo.; G. H. Bolt, chief clerk; F. D. Helm, fiscal agent.

Williston Project.—W. S. Arthur, project manager and chief clerk, Williston, N. Dak.; H. C. Melase, fiscal agent.

Yakima Project.—J. L. Lytal, project manager, Yakima, Wash.; R. K. Cunningham, chief clerk; J. C. Gawler, fiscal agent; M. D. Scroggs, superintendent of irrigation, Sunnyside, Wash.; J. S. Moore, superintendent of irrigation, Route 6, Yakima, Wash.

Yakima Project, Tieton Dam.—F. T. Crowe, construction engineer, Rimrock, Wash.; C. F. Gleason and W. C. Christopher, engineers; V. G. Evans, chief clerk; C. F. Williams, fiscal agent.

Yuma Project.—P. J. Preston, project manager, Yuma, Ariz.; R. M. Priest, superintendent of construction; D. C. McConaughy, engineer, Yuma Mesa Division; D. C. Caylor, superintendent of irrigation; C. A. Denman, chief clerk; E. M. Philibaum, fiscal agent.

INDIAN PROJECT

Flathead Project.—C. J. Moody, project manager, St. Ignatus, Mont.; chief clerk; J. P. Siebeneicher, fiscal agent.

FIELD LEGAL OFFICES.

Boise, Idaho.—B. E. Stoutemyer, district counsel. Projects: Boise, Minidoka, King Hill, and Jackson Lake Enlargement.

Denver, Colo.—Legal section, offices of chief engineer and field commissioner; R. M. Patrick and Armand Offutt, district counsel.

El Paso, Tex.—J. N. Beardslee, district counsel. Projects: Rio Grande, Carlsbad, and Hondo.

Helena, Mont.—E. E. Roddis, district counsel, Helena, Mont. Projects: Flathead, Huntley, Milk River, St. Mary Storage, Sun River, Williston, Lower Yellowstone, and Shoshone.

Mitchell, Nebr.—Brooks Fullerton, district counsel. Projects: North Platte, Belle Fourche, and Riverton.

Montrose, Colo.—J. R. Alexander, district counsel. Projects: Grand Valley, Uncompahgre, and Strawberry Valley.

Portland, Oreg.—....., district counsel, Post Office Building. Projects: Yakima, Okanogan, Umatilla, Klamath, and Baker.

San Francisco, Calif.—P. W. Dent, district counsel, 349 Pacific Building. Projects: Salt River, Yuma, Orland, and Newlands.

THE NEW RECLAMATION ERA is published every month by the Bureau of Reclamation of the Department of the Interior, Washington, D. C. It is printed by the Government Printing Office, Washington, D. C.

Copies of the **NEW RECLAMATION ERA** are sent regularly without direct charge to the water users of the reclamation projects constructed and operated by the Government. Persons desiring to subscribe for the **NEW RECLAMATION ERA**, other than water users, may secure it for the price of 75 cents per year, payable in advance. Subscriptions should be sent to the Chief Clerk, Bureau of Reclamation, Washington, D. C., and remittances in the form of postal money order or New York draft should be made payable to the Special Fiscal Agent, Bureau of Reclamation. Postage stamps are not acceptable in payment of subscription.

THE waste of desert and mountain has been unsympathetically called "the land that God forgot." Time will show, and already time has begun to show, that above all other sections Arid America is the God-remembered land. He evidently remembered that somewhere there must be a place where man should become supremely alive to his divinity—that somewhere he must be driven by the club of necessity into a brotherhood of labor—that somewhere the material must be blended with the spiritual until man should stand erect, the conscious partnership of the universe.

—From "The Conquest of Arid America"

By William E. Smythe.

NEW RECLAMATION ERA

VOL. 15

APRIL, 1924

NO. 4



SUGAR BEETS - A CASH CROP ON THE IRRIGATION PROJECTS.

APHORISMS ON RECLAMATION

Absentee ownership of irrigation projects is a failure. To be permanently successful, irrigation projects must be owned, repaired, and operated by the farmers on the land.

Construction costs in Government reclamation have been above engineers' estimates. To protect the Government a margin of safety should be added to the estimated costs.

If reclamation water rights are associated with those of municipalities for domestic use or power production, the rights of the farmer might become subservient to the organized influence of greater numbers should a seasonal or temporary shortage of water occur.

NEW RECLAMATION ERA

Issued monthly by the Department of the Interior, Bureau of Reclamation, Washington, D. C.

HUBERT WORK
Secretary of the Interior

DAVID W. DAVIS
Commissioner, Bureau of Reclamation

Vol. 15

APRIL, 1924

No. 4

PRESIDENT COOLIDGE'S RELIEF MEASURE PASSES SENATE

Proposal of national executive in annual message to Congress giving Secretary of Interior authority to suspend, reassess, and readjust charges against water users

ACTION on the section of President Coolidge's message to Congress recommending relief for water users on Government reclamation projects was taken recently by the United States Senate when the bill introduced by Senator Phipps, of Colorado, passed that body after it had been favorably reported on by the Secretary of the Interior.

In his message the President declared that the Secretary of the Interior should be granted definite authority of law to suspend, readjust, and reassess all charges against water users in his discretion. The bill as it finally passed the Senate without opposition empowered the Secretary of the Interior to defer the dates of payments of any charges, rentals, and penalties that have accrued on reclamation projects. It reads as follows:

"Be it enacted, etc., That the Secretary of the Interior is hereby authorized and empowered, in his discretion, to defer the dates of payments of any charges, rentals, and penalties which have heretofore accrued, or may hereafter accrue, prior to the 1st day of January, 1925, under the act of June 17, 1902 (32 Stat. L., p.

RECOMMENDATIONS IN PRESIDENT'S MESSAGE

BY REASON of many contributing causes, occupants of our reclamation projects are in financial difficulties, which in some cases are acute. Relief should be granted by definite authority of law empowering the Secretary of the Interior in his discretion to suspend, readjust, and reassess all charges against water users. This whole question is being considered by experts. You will have the advantage of the facts and conclusions which they may develop. This situation, involving a Government investment of more than \$135,000,000, and affecting more than 30,000 water users, is serious. While relief which is necessary should be granted, yet contracts with the Government which can be met should be met. The established general policy of these projects should not be abandoned for any private control.

388), and amendatory and supplemental acts, and upon irrigation projects on Indian reservations, as may, in his judgment, be necessary to the making of the rearrangements and adjustments in or concerning any irrigation project now existing under said act: *Provided, however,* That interest at the rate of 6 per cent per annum on the amount of each payment so deferred shall be collected in lieu of any penalties that may now be provided by law in cases of delinquencies in such payments: *Provided further,* That no payment shall be deferred in any particular case beyond the date on which the last payment of construction charges shall be required by law to be made in that case, thereby permitting the distribution of the deferred payments over the life of existing contracts."

In a statement before the Senate when the measure was called up for debate, Senator Phipps, of Colorado, said:

"A little over one year ago we authorized the Secretary of the Interior in his discretion, where it was necessary for the relief of farmers, to permit them to have their charges extended for a year or two upon the payment of interest at 6 per cent. The present bill would cover the time that has now elapsed, and those payments are falling almost immediately due. The settlers on the project are not all of them able to meet the obligations. The Secretary is without authority to extend the payment of the charges."

Only a single amendment was added to the measure. This provided that the same authority given the Secretary of the Interior for the deferring of payments on projects under the supervision of the Bureau of Reclamation should be granted in the case of irrigation projects on Indian reservations. The amendment was adopted without a dissenting vote. The measure is now being considered by the Committee on Irrigation of Arid Lands of the House of Representatives.

REPORT SCHEDULED IN APRIL

THE final report of the Special Advisory Committee after one of the most exhaustive studies of every phase of Government reclamation will be completed and submitted to the Secretary of the Interior in the early part of April.

Plans for making the report during the month of March were altered when the members of the committee decided to make their recommendations so comprehensive as to cover not only a new general policy but to include definite and specific recommendations for the solution of the problems existing on each of the 24 individual projects now in operation. The

result will be that no feature of Government reclamation will be neglected even to the smallest detail.

The report is expected to propose an entirely new method of procedure before final action is taken in the construction of new projects or additions to old projects in order to safeguard the Government from loss, as well as to protect the farmers and settlers, who go on the projects or who already hold lands within them, from being burdened with operation, maintenance, and construction charges beyond their capacity to pay.

(Continued on page 50.)

LEGISLATION PROPOSED FOR NEW RECLAMATION PROJECTS

Reports from Secretary of Agriculture on soil and crop production and from Secretary of Commerce on transportation, markets and economic factors are provided in addition to engineering data.

PROPOSED legislation, designed to encourage the undertaking of new and feasible reclamation projects under conditions which will as nearly as possible secure their success, has been submitted to Congress by the Secretary of the Interior in the form of a drafted bill. Senator McNary, of Oregon, chairman of the Senate Committee on Irrigation and Reclamation, promptly introduced the measure in the Senate.

The new plan provides that before attempting the construction of a new irrigation project or the extension of an existing project in the future, the Secretary of the Interior shall first obtain a detailed report concerning water supply, engineering features, cost of construction, land prices, and probable acre cost of development. In addition, a report shall be secured through the Secretary of Agriculture with relation to the climate, soil, kinds of crop for which the project is adapted and probable production, and also a report through the Secretary of Commerce with respect to transportation facilities, markets, and other economic factors affecting the proposed project.

The proposed measure has the approval of the Committee of Special Advisers who have been conducting an exhaustive study of the policy and methods of Government reclamation during the last five months. In a communication forwarded recently to the chairman of the Committees on Irrigation and Reclamation of the Senate and House of Representatives, the Secretary said:

"I inclose herewith draft of measure de-

signed to encourage the undertaking of new and feasible reclamation projects under conditions which will, as nearly as possible, insure their success.

EMPLOYEES SUBSCRIBE TO HARDING MEMORIAL

Employees of the Bureau of Reclamation, including both the Washington and Denver office and the field forces, have contributed generously to the Harding Memorial. The total amounted to \$654.50.

The contributions include: Washington office, \$60; Denver office, \$24.50; Field legal offices, \$21.50; Yuma, \$50; Orland, \$17; Grand Valley, \$4; Uncompahgre, \$29; Boise, \$54.50; King Hill, \$25; Minidoka, \$17; Huntley, \$1; Milk River, \$9; Sun River, \$18; Lower Yellowstone, \$22; North Platte, \$44; Newlands, \$17; Carlsbad, \$16; Rio Grande, \$30; Williston, \$6; Umatilla, \$17; Klamath, \$13; Belle Fourche, \$9; Strawberry Valley, \$10; Yakima, \$45; Shoshone, \$52.

Two Indian projects contributed an additional \$41 as follows: Flathead, \$35; Fort Peck, \$6, making a grand total of \$654.50.

"Lack of proper study along various lines, particularly those of climate, soil, crops, and economic problems, coupled with underestimates as to cost of construction, have contributed to difficulties

on some projects already built or under construction.

"I am very much in favor of undertaking immediately some new and feasible irrigation projects, but only after careful selection.

"The plan embodied in the proposed bill has the approval of the Committee of Special Advisers on Reclamation, and will be set forth in its forthcoming report and recommendations, but in order to save time and expedite the undertaking of some new reclamation projects in the West, I am transmitting the draft of measure at this time, with the suggestion that, if it meets with your approval, it be promptly introduced and enacted."

The draft of the proposed legislation reads as follows:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That hereafter no irrigation project proposed for construction under the act of June 17, 1902 (32 Stat. at Large, p. 388), and acts amendatory thereof or supplementary thereto, and no extension of an existing project shall be approved or undertaken until information, in detail, has been secured concerning its feasibility; its adaptability for actual settlement and farm homes, and the probable return of the cost thereof to the United States. To this end, it is hereby directed that in each proposed project, before approval or undertaking of such project, or extension of an existing project by the Secretary of the Interior, report shall be secured by him, in detail, concerning water supply, engineering features, cost of construction, land prices, and probable acre cost of development. The Secretary of the Interior also shall secure a report through the Secretary of Agriculture, in detail, with relation to the climate, soil, kind of crops for which the project is adapted, and probable production; also a report, through the Secretary of Commerce, with respect to transportation facilities, markets, and other economic factors upon or affecting the proposed project."

Purebreds of good quality do better in the feed lot than scrubs or common stock.

A canvass of livestock feeders over the entire country shows that purebreds make about 40 per cent more product for their owners than scrubs or common stock when fed in the same way.

REPORT SCHEDULED IN APRIL

(Continued from page 49.)

It will also recommend an amendment to the present reclamation law proposing a different system of repayment of construction charges by water users as well as a provision for the charging off of a part of the costs of construction now levied against farmers on certain projects where the crop production does not give them sufficient revenue to meet them. Other subjects to be taken up in the report will be recommendations for a change in policy and administration and include:

Soil, climate and agricultural conditions.

Transportation facilities, freight rates, and markets.

Conditions necessary for settlement of projects.

Preparation of lands for farmers before settlement.

Selection of settlers locating on projects.

Proper size of reclamation farm units.

Necessity for drainage and cost payments.

Settlement and disposition of lands on projects.

Project costs and the prospects for repayment.

Development of electric power on various projects.

The report of the Special Advisory Committee is expected to be one of the most lengthy and comprehensive documents ever compiled on the subject of Government reclamation.

DEFINITE FEDERAL POLICY ON COLORADO RIVER URGED

Flood control, impounding of water for farming, storing water for generating of electricity and All-American canal should be considered by Congress before final action is taken

DECLARING that the time had come for the determination of a definite Government policy covering all phases of the development of the Colorado River Basin, Secretary of the Interior Work has sent his report covering the proposed Swing-Johnson bill to Congress. It follows in part:

The Colorado River Basin has been under observation, survey and study, and the subject of reports to Congress since the close of the Civil War. More than \$350,000 have been expended by the Bureau of Reclamation since the Kinkaid Act of May 18, 1920. More than \$2,000,000 have been expended by other agencies of the Government. The time has arrived when the Government should decide whether it will proceed to convert this natural menace into a national resource.

The scope of this subject in many directions, its urgency in a few, and its opportunities for developments, together, demand the determination of a definite Government policy. Not temporary expedients but plans comprehending the immediate necessities and those of succeeding generations, especially for power, which is now the pressing necessity of this country as a whole and is going to become an acute problem for the territory within distribution distance for electrical energy of the Colorado River.

The proposed Boulder Canyon dam treated will raise the water surface 605 feet, a height greater than that of the Washington Monument and more than 2½ times as much as the Don Pedro dam in California, which has the highest lift of any in this country and probably in the world.

The dam would contain over 3½ million cubic yards of concrete, which is more than three times as much as the Assuan dam in Egypt, containing the greatest amount of masonry of any dam heretofore built.

The cost of the Boulder Canyon dam will be about \$50,000,000, two and two-thirds times as much as that of the Assuan dam.

The reservoir formed by the dam will be 120 miles long and will have an area of 157,000 acres, which is one and one-half times as much as that of Gatun Lake on the Panama Canal. The proposed reservoir will have a capacity of 34,000,000 acre feet, 8 times as great as that of Gatun Lake and nearly 13 times as great as that of the Elephant Butte Reservoir in New Mexico, the largest in this country.

The total cost of the enterprise, in-

GILA RIVER

THE Gila River enters the Colorado River below all proposed dams and presents problems independently. The State of Arizona can, it is believed, and doubtless will in time, utilize its waters, removing it as a flood menace, and relieve the Government from the necessity of its consideration.

ALL-AMERICAN CANAL

The estimated cost of an All-American Canal is \$31,000,000. Four hundred thousand acres are now irrigated in the Imperial Valley. One hundred thousand acres in the irrigation district are not irrigated, and 200,000 acres could be brought into the district—making a total ultimate irrigable area in the Imperial Valley in California of nearly 800,000 acres. The reclaiming of this valley was not undertaken by the Government, but its people are appealing for protection. They feel insecure and are restive. Its bona fide settlers should be sympathetically heard.

PESCADERO CUT-OFF

It is believed by those familiar with the behavior of the Colorado River that the Pescadero cut-off, an artificial deflection of the Colorado River, completed two years ago and now obviating the danger from floods, may not serve for more than 15 years, after which this basin may become silted and filled. One hundred thousand acre-feet of silt is deposited annually. The river will then return to its old channel and again threaten life and property. This temporary protection should not be permitted to delay permanent structures for flood control at least.

COLORADO RIVER COMPACT

A compact has been formulated between States and approved by the legislatures of Wyoming, Colorado, Utah, Nevada, New Mexico, and California, intended to regulate, control, and protect the rights of the several States named to the distribution and use of the waters of the Colorado and its tributaries for domestic and agricultural purposes. It will be necessary to have the State of Arizona join in this compact before it becomes binding on any of the signatories or before further appropriation of water for any purpose on the lower basin may be undertaken by common consent.

cluding the building of the dam, power plant, and transmission lines, will be about \$130,000,000 (estimated) which is about one-third of the cost of the Panama Canal. The cost given does not, however, include that of the All-American Canal, which would add \$31,000,000.

The total cost of three features of dam, transmission lines, and All-American Canal should be estimated at \$200,000,000.

An opinion is no better than the reasons for it. Whether or not it is practical at any cost to divert through tunnels in the canyon walls such a body of water from the river long enough to build this substructure, whether a mass of masonry unapproached in size in the history of engineering is practicable, or whether it is possible to give more than an intelligent guess of its cost are problems not to be passed upon by one man alone, but should challenge the judgment of the country's ablest engineers and be subject to deliberate review by the Congress. Congress should itself appraise the necessity of an outlay of such magnitude and justify the financial obligation to be assumed by the Government before beginning this project.

Flood control, considered alone, promises no direct return of expenditure to the Government. Irrigation of farm lands has been a recognized practice of the Government for more than 20 years, but reclamation has not made adequate, direct returns to the Government in dollars, although it has invited agricultural development not otherwise possible and is a policy that should be fostered.

A dam only high enough to raise water for gravity irrigation of mesas, or to give fall for power production, ceases to offer flood control unless constructed above these determined levels.

Experience has demonstrated that absentee ownership of private irrigation projects fails. To be permanently successful, irrigation projects must be owned, repaired, and operated by the farmers on the land. Agricultural features under the Boulder dam project should be disregarded as an investment asset to the Government in the near future.

If reclamation water rights are associated with those for municipalities for domestic use or power production, the rights of the farmer would become subservient to the organized influence of greater numbers, with conflicting necessities, should a seasonal or temporary shortage of water occur, always a con-

(Continued on page 52.)

PICTORIAL LESSONS IN PRACTICAL IRRIGATION.

LESSON No. 4.



Irrigation of an orange grove on the Salt River project.

THE dry air, abundant sunshine, and relatively high temperature of the growing season in the irrigated region cause evaporation to go on very rapidly. From a free water surface 1 foot square it frequently happens that 2 feet of water evaporate in one month. The rate of evaporation from a wet soil is fully as rapid. Moreover, since the soil is porous, as water is evaporated from the surface more water is drawn from below the surface to replace that which has been lost by evaporation. This in turn is evaporated. Thus, under the influence of the hot sunshine and dry air of the irrigated section much of the water added to the soil in irrigation is lost by evaporation. Water so lost does not assist in producing crops. It is an outright loss. Besides, the labor of bringing such water upon the soil has been wasted.

One of the best methods of preventing excessive evaporation of water from soils is to stir or cultivate the surface soil to a

depth of a few inches just as soon after each irrigation as a cultivator can be safely brought upon the land. This forms a mulch of fine dry soil over the field, which has the effect of reducing evaporation very greatly. Besides, such surface tillage of the soil has other beneficial effects upon the land. The wise farmer will practice cultivation quite as much as irrigation.

The above illustration shows a well-cultivated orchard in a section where clean orchard tillage is practiced.

Other methods of reducing evaporation will be discussed later, but none is more effective than cultivation. So notable are the beneficial effects of tillage that Jethro Tull, experimenting and writing upon this subject 200 years ago, declared that "tillage is manure."

The wise stockman recognizes that careful attention to little details pays well in the end.

COLORADO RIVER POLICY FAVORED

(Continued from page 51.)

tingency to be guarded against in the semiarid West.

I am concerned for the future of people menaced by temporarily controlled floods and entertain a lively sense of the magnitude, the necessities, and the importance of conserving to the United States as a whole the use of this potential natural force for the great waiting territory to be directly benefited.

I would recommend that the Congress promptly initiate such commensurate measures as it may determine the Government's financial status will warrant and probable commercial returns may justify from a point of view 50 or 100 years hence rather than now. The whole subject is of national moment, should be surveyed in a broad way, and is well worthy the serious consideration of Congress.

A CHRONOLOGY OF RECLAMATION DURING PAST YEAR

March 5, 1923, to March 15, 1924

THE following is a chronology of the vital changes affecting the administration of Government reclamation during the past year:

MARCH 16, 1923.

Special assistant appointed.—D. W. Davis, former Governor of Idaho, is appointed Special Assistant Secretary of the Interior for the purpose of supervising all matters connected with reclamation.

MARCH 28, 1923.

Investigation commenced.—Inspection force of the Department of the Interior started upon an exhaustive investigation of complaints of excessive costs of operations on various reclamation projects with ultimate object of eliminating all unnecessary expenses.

APRIL 13, 1923.

Field Commissioner named.—Miles Cannon, former Commissioner of Agriculture of the State of Idaho, appointed to post of Field Commissioner to develop and promote improvement of agricultural production and conditions on reclamation projects.

APRIL 15, 1923.

Officials visit projects.—In furtherance of a policy for improving reclamation projects along business and agricultural lines, Special Assistant Secretary D. W. Davis, the then Director of Reclamation Service Arthur P. Davis, and Field Commissioner Miles Cannon begin a tour of the various reclamation projects in the West extending over two months.

JUNE 18, 1923.

Commissioner's office created.—Office of Director of the Reclamation Service abolished and D. W. Davis, former Governor of Idaho, appointed as Commissioner of Reclamation Bureau, effective July 1, 1923. Name of Reclamation Service changed to Bureau of Reclamation.

JUNE 19, 1923.

No changes in personnel.—Secretary of the Interior announces that there will be no sweeping changes in personnel of Reclamation Bureau, but that it will be placed on a business basis and operated in the interest of settlers on projects as well as for the protection of the Government.

JUNE 20, 1923.

Engineer in Chief designated.—F. E. Weymouth, former chief engineer of the Reclamation Service, officially designated as the Engineer in Chief of the Bureau of Reclamation.

JULY 10, 1923.

Cooperation with settlers.—A program of cooperation between managers of reclamation projects and the farmers on the projects was outlined in which managers were enjoined to consult settlers, call conferences with them, investigate complaints, and redress justifiable grievances.

AUGUST 1, 1923.

Publication is revised.—The editorial policy of THE RECLAMATION RECORD, official publication of the Bureau of Reclamation, printed monthly for the benefit of the water users of the various projects, is changed to deal with irrigation, marketing, and agricultural problems of the farmers, as well as engineering questions.

AUGUST 17, 1923.

New policy outlined.—Tentative policy adopted by Bureau of Reclamation for inculcation of business principles into the operation of existing reclamation projects and in the construction of new projects which included—

Existing projects: Reduction of overhead expenses; encouragement of subdivision of large land holdings; diversification and rotation of crops, aid in securing creameries, sugar factories, and other industries on projects; cooperation with farmers in the packing, handling, shipping, and marketing of crops.

New projects: Recommend against new projects where cost is so high that there is a reasonable probability farmers will be unable to repay the construction. Recommend against new projects where probable operation and maintenance costs will be too heavy a burden for the water users to carry annually. Study soil, climate, and markets, as well as engineering features; make survey of necessities for drainage system; make accurate calculations of cost of construction, so that when work is completed no unexpected burden will fall on the water users.

SEPTEMBER 4, 1923.

Investigation of projects.—Commissioner Davis, Chief Engineer Weymouth, and

Field Commissioner Cannon begin a tour of investigation of every one of the Government projects. During the course of the following three months each project was personally visited by one of these officials of the Bureau.

SEPTEMBER 10, 1923.

Advisory committee formed.—Secretary of the Interior forms Special Advisory Committee to investigate the whole system of Government methods and policies in reclaiming arid and semiarid lands, appointing the following citizens of national prominence:

Julius Barnes, President of the United States Chamber of Commerce.

Oscar E. Bradfute, President of the American Farm Bureau Federation.

James R. Garfield, former Secretary of the Interior.

Elwood Mead, engineer and author of irrigation and reclamation works.

Thomas E. Campbell, former Governor of Arizona.

Dr. John A. Widtsoe, former President of State Agricultural College of Utah.

Clyde C. Dawson, an expert on irrigation and reclamation law.

SEPTEMBER 20, 1923.

Special audit started.—A special audit of the books of the Bureau of Reclamation is inaugurated by the Secretary of the Interior by expert accountants for the purpose of revising the methods of book-keeping and adopting new form sheets for keeping the financial records. Two accountants also commence audit of the books of the Uncompahgre and Grand Valley project offices in Colorado.

SEPTEMBER 29, 1923.

Special Advisors meet.—The first meeting of the Special Advisory Committee on Reclamation called by the Secretary of the Interior for October 15, 1923, in the Interior Department Building, Washington, D. C.

OCTOBER 15, 1923.

Advisory Committee convenes.—Special Advisory Committee meets and begins sessions after speech by Secretary of the Interior, in which he points out the necessity for survey of entire reclamation policy and methods of the Government.

(Continued on page 54.)

A CHRONOLOGY OF RECLAMATION.

(Continued from page 53.)

Attention of the members of the committee is called to the fact that nearly all of the projects are in such condition that some radical reforms and improvements must be made if they are to be saved and the farmers protected from the loss of their homes.

NOVEMBER 6, 1923.

Committee collects data.—Special Advisory Committee starts a minute examination into the Reclamation Bureau and the collection of data from every available source on all phases of reclamation. Committee goes into continuous session, and hears testimony from many witnesses.

NOVEMBER 22, 1923.

Congressmen assist committee.—Senators and members of the House of Representatives from Western States specially invited by the Secretary of the Interior to give Special Advisory Committee any information, advice, or suggestions they may have upon reclamation projects located in their respective States.

DECEMBER 1, 1923.

Washington office reorganized.—Washington office of the Reclamation Bureau completely reorganized; position of Assistant Commissioner abolished and several divisions eliminated and their functions coordinated. Photographic labora-

tory transferred out of the bureau. Services of 12 employees discontinued, with saving of \$43,500; 16 employees given nominal promotions; services of 15 consulting engineers and 7 per diem employees terminated.

DECEMBER 6, 1923.

President favors relief.—President Coolidge in annual message to Congress recommends that relief to the occupants of reclamation projects should be granted by definite authority of law empowering the Secretary of the Interior in his discretion to suspend, readjust, and reassess all charges against water users.

DECEMBER 7, 1923.

Analysis handed committee.—Special Advisory Committee handed analysis by Secretary of the Interior showing the financial status of 28 irrigation projects constructed by the Government. In tabulated form it gives original estimated acreage, with acreage actually irrigated, amounts paid on construction costs and operation and maintenance costs, and the length of time since water was first furnished on each project.

JANUARY 1, 1924.

Divide bureau's functions.—Through a reassignment of the duties of the various officials of the Reclamation Bureau, the functions of Government reclamation

were divided. The Field Commission was placed in charge of all matters pertaining to the operation of the projects, the delivery of water, lands, crop production, handling and marketing, improvement of farm conditions, industrial betterment, collection of water rentals, and other charges and procuring settlers. His headquarters were located at Denver. The Chief Engineer was assigned the task of handling the engineering work, including reconnaissance and investigation of proposed projects and the designing of irrigation works and their construction.

JANUARY 3, 1924.

Denver office coordinated.—A survey by coordinators of the Denver office of the bureau was begun. As a result the positions of two Assistant Chief Engineers were abolished and there was a transfer of many clerical employees in the merging of the various divisions. Savings made were approximately \$20,000 annually in the Denver office, representing decrease in rentals for quarters and elimination of surplus employees. Other savings are anticipated when the survey is completed.

JANUARY 14, 1924.

Relief bill recommended.—Secretary of the Interior recommends to the Senate Committee on Irrigation and Reclamation the enactment of a law authorizing the extension of time on payment of construction, operation, and maintenance charges providing that amounts of deferred payments shall bear a 6 per cent rate of interest, the authority for such deferment to be vested in the Secretary of the Interior up to January 1, 1925.

JANUARY 17, 1924.

Hearings for water users.—Special Advisory Committee begins a 10-day hearing at Salt Lake City, Utah, at which a total of 225 representatives of water users, water users' associations, and settlers from 24 of the Government reclamation projects were in attendance and publicly expressed their opinions and suggested remedies for the solution of problems confronting their respective projects.

FEBRUARY 1, 1914.

Committee works on report.—Special Advisory Committee returns to Washington after hearings in Salt Lake City, Utah, and begins the preparation of their final report to be submitted to the Secretary, the President, and the Congress.

FEBRUARY 12, 1924.

Cost of main office.—Secretary of the Interior recommends to Congress that
(Continued on page 55.)



Sentinels of the desert

RECLAMATION CHRONOLOGY.

(Continued from page 54.)

the annual cost of the main office of the Bureau of Reclamation at Washington, D. C., be no longer charged against the water users of the various reclamation projects, but be borne by the Federal Treasury.

FEBRUARY 28, 1924.

Relief bill passes Senate.—Bill authorizing Secretary of the Interior to extend time on payments of construction, operation, and maintenance charges on reclamation projects up to January 1, 1925, passes the Senate.

MARCH 1, 1924.

Publication's name changed.—The name of THE RECLAMATION RECORD, official organ of the bureau, is changed to the NEW RECLAMATION ERA to denote the birth of a new régime in Government reclamation and in furtherance of revised policies.

MARCH 13, 1924.

Total savings are \$63,000.—In a report to the President the Secretary of the Interior announces that total savings in the Reclamation Bureau up to this date are approximately \$63,000.

MARCH 14, 1924.

Legislation for new projects.—Upon specific recommendation of the Special Advisory Committee, Secretary of the Interior submits legislation to Congress for purpose of encouraging the undertaking of new and feasible reclamation projects and the extension of existing projects, in which it is proposed that before new construction is attempted detailed reports shall be first obtained concerning water supply, engineering features, cost of construction, land prices, and probable cost per acre. In addition, a report shall be secured through the Secretary of Agriculture with relation to the climate, soil, kinds of crops for which the project is adapted, and probable production, and also a report through the Secretary of Commerce with respect to transportation facilities, markets, and other economic features affecting the proposed project.

MARCH 15, 1924.

Final report in April.—Special Advisory Committee announces that its final report will be completed the early part of April for submission to the Secretary of the Interior, to the President, and to the Congress, and that in addition to recommendations for changes in the general

SUGGESTIONS ON SUGAR-BEET GROWING



Sugar beets on the Salt River project.

AS the result of a questionnaire sent out to sugar-beet growers in Montrose and Delta Counties, Colo., a number of practical suggestions were developed, as summarized below:

Time of plowing.—On the average, fall plowing gave the best results. However, deep spring plowing, well manured and disked, gave the heaviest tonnage reported. This shows the necessity of making a good seed bed, well packed and fertilized, to get the best results.

Depth of plowing.—Results favored 9 to 12 inches.

Seed per acre.—This varied from 10 to 24 pounds, the average being 15 pounds.

Fertilizing.—The best yields all showed fertilizing from 6 to 21 tons per acre.

Thinning.—With one exception, those who finished thinning by June 1 and watched their labor while doing this work had the best results. One grower did not finish until July 10, yet made 15 tons; but he obtained these results from careful irrigation and hoeing.

policy and methods of government recommendations will contain also specific recommendations on each of the 24 individual existing projects.

Cultivation.—The best results were from only three to four cultivations. Careful hoeing and pulling of weeds were shown to be more beneficial than too many cultivations.

Irrigation.—There can be no set rule for irrigation, but a general principle has been established by the successful growers—namely, that frequent and short irrigations make the crops. The top of the ground should not be wet. The moisture should be furnished to the roots. Nine to twenty irrigations, according to conditions, is the report of those with heaviest yields, except one grower who had damp ground, and he only irrigated up. Apparently those who failed in big yields can attribute it to letting the water run too long, especially when starting the beets. In addition, the furrows were kept too shallow after the second irrigation.

The above summary, in the opinion of T. W. Monell, who sent out the questionnaire, indicates that no crop will pay better for care and labor expended; that brain and muscle, with close attention to details, will give good returns and enhance the value of the land.

IMPORTANT PRINCIPLES OF IRRIGATION PRACTICE OUTLINED

Settlers and farmers on reclamation projects must inform themselves on the proper method of using water in order to assure full profit on their crop

(By Dr. John A. Widtsoe.)

This is the second of a series of three articles on the principles of irrigation practice by Dr. John A. Widtsoe, former president of the Utah Agricultural College and the University of Utah. Doctor Widtsoe has been serving as secretary of the Special Advisory Committee on Reclamation.

FIELD-DITCH or field-lateral method.—

This method, which is the most largely used method of open-field flooding, is especially adapted to level lands with gentle slopes. By this method the water is taken out of the main ditches at various intervals and as it flows over the field is distributed properly over the field by small temporary ditches or furrows. These small laterals follow the high places of the field, and the water overflowing their banks covers the field.

For instance, wheat is planted in the usual way, without reference to the field ditches which are made after the wheat has germinated and is a few inches high. The small laterals are made with a small horse plow made for the purpose, or they are made by the irrigator with a hoe. The field ditches of lucern and similar permanent crops, once made, remain from year to year, except that they may be deepened a little from season to season. These field ditches, however, whether in wheat or alfalfa, are so small as to be of no hindrance in the cultural operations of the farm.

The essential feature of this method of irrigation is the guiding of the water over the land through numberless furrows or small ditches. This is hard and slow work. One man can cover daily only a few acres at most by this method. The greatest advantage of the field-ditch method is that the first cost of preparing the land for irrigation is small, the top soil is not disturbed, and the field is not cut up by levees that make ordinary farming operations difficult. The disadvantages are that the necessary field labor is hard, the field ditches must be made over from year to year, and, finally, it is difficult to secure an even distribution. It is clear, however, from the great extension of this method that the advantages overshadow the disadvantages. This is the method employed by the Mormon pioneers when they founded irrigation in the Salt Lake Valley and is still one of the safest methods of irrigation in Utah, Idaho, Wyoming, Colorado, and some of the other irrigated States. Practically all manner of crops,

except those planted and cultivated in rows, can be irrigated by this method. In spite of its disadvantages, immense yields, the largest on record, have been secured by this method of irrigation.

The border method.—The border method of irrigation is an open-field method. By this method the field is divided by low flat ridges of earth into long narrow strips, the lower ends of which are open. The ridges are spaced about 50 feet apart and are frequently 800 feet long. Water is guided over the land by field ditches. This modification of the field-ditch method has for its purpose the better control of the water. The ridges prevent the water from spreading beyond the distance determined between the ridges. This enables the irrigator to watch the water more closely. When the water reaches the lower end of the strip, it may be shut off and another strip attacked. The advantages and disadvantages are practically those explained for the field-ditch method, except that the lateral ridges make the handling of the water somewhat easier. In cultural operations the ridges are in the way.

The check method.—This is the most important of the closed-field variation of applying water by the flooding method. The field is laid off into compartments or checks wholly surrounded by levees. The water is admitted at the upper end and completely fills the compartments until, in many cases, it overflows at the lowest point of the levee. This method of irrigation has been practiced from the earliest antiquity. The irrigated countries of Europe, Asia, and Africa employ this method very largely.

Evidently it is adapted only to comparatively level land; if the slope is great, the lower levee must be made too high for practical purposes. A large head is always necessary, for if the head is small the land, especially if sandy, is likely to absorb the water so fast at the upper end that the lower end receives only a small part of the water intended to cover the whole check. The flow of water should be from 5 to 10 second-feet in order to make the method thoroughly successful. In the older countries the checks are usually small. In America the checks are often very large—from 10 to 20 or more acres. The check method of irrigation to be really successful must be practiced with small checks, at the most 1 to 3 acres in area.

The compartments may be laid off in various ways. If the land does not slope

too much, the whole farm is laid off into square or rectangular checks, into which the water is admitted in succession. Where the land is uneven or the slope steep the checks are made to conform to the contour of the land. In either case water must be admitted at the highest point and be brought rapidly into the compartment, so that the ground may be covered thoroughly and in a short time. At times a depression is made in the lower levee over which the excess of water passes into the next lower check.

The check method of irrigation has some advantages. Once the checks or the levees have been well constructed, one man may irrigate 7 to 15 acres a day. The cost of preparing the land for irrigation after the first year, when the levees are made, is very small. The quantity of water applied can be very accurately gauged and evenly distributed by this method. For crops such as rice, which demand that the soil be kept moist or even submerged for long periods throughout the year, the check method of irrigation is indispensable. Such crops are few, and the check method is, in fact, used more extensively for other crops. The check method of irrigation also has many disadvantages. The levees cost from \$7 to \$20 an acre, under American conditions, where the compartments are large. The cultural operations of the farm are delayed and the machinery damaged by passing back and forth over the high levees. In any case they are in the way and are a disagreeable feature on the farm. The farmer finds it difficult to change to new and possibly better cropping systems without going to the large expense of leveling the old levees and throwing up new ones. If the soil bakes, this method should not be employed at all, since water covers for some time the whole area. It is impossible by this method to keep water from touching the crop. The relatively large quantities of water that must be used by this method tend to keep the roots very near the surface, and the crop will be more intensely affected by adverse conditions of heat or cold.

The check method is, next to the field-ditch method, the most important method of applying water to crops; yet its disadvantages overshadow its advantages, and it is a method which in all probability will gradually pass out of general use and be retained only where crop, soil, or other conditions make it necessary.

(To be concluded next month.)

SWEET CLOVER PASTURE ON THE NORTH PLATTE PROJECT.

At first looked upon as a weed pest, sweet clover is rapidly gaining prominence as a pasture crop, returning a profit equal to that from other crops and improving the land for crops that follow.

IT was only a few years ago, according to James A. Holden, superintendent of the Scottsbluff Experiment Farm, that sweet clover was looked upon by farmers of the North Platte Valley as the ruination of the irrigated farms. Growing along the irrigation ditches it produced an abundance of seed which was carried by the water to the farms below and there grew as a weed and produced more seed when not destroyed. The better farmers instructed their men to stop under all circumstances and chop down a sweet clover plant when seen growing on the farm. Many a farmer lay awake nights thinking out schemes for its eradication. But views have changed. This once dreaded plant is now looked upon as a godsend by many of the very farmers who once condemned it.

Sweet clover is rapidly gaining favor as a pasture crop, the very thing that is so often lacking on an irrigated farm. It has been generally believed that irrigated land was too valuable to be used for pasture even with dairy cows. But with a pasture crop that will return a profit equal to that from other crops and one that will improve the land so that there will be higher yields from the crops that follow it farmers are coming to look upon sweet clover and pasture in a different light. On the North Platte project the yields of all crops are greatly increased when following either alfalfa or sweet clover. When either of these crops is pastured on the land the value to the soil is still greater. There is less danger from bloat in pasturing cattle and sheep on sweet clover than on alfalfa. As a precaution against bloat, even with sweet clover the stock should be kept on the pasture both day and night.

The best practice in planting sweet clover is to seed it with barley as a nurse crop early in the spring. It can be seeded as late as the middle of July with success, but when seeded after the middle of May it should be seeded alone and irrigated frequently. Twelve pounds of clean seed per acre should be used. Grasshoppers do not damage this crop as they do alfalfa. Sweet clover furnishes some pasture the first season following the removal of the grain, but it is during the second summer that it does its best. Sweet clover is a two-year crop; it is seeded one year and dies out during the second winter.

Sweet clover has both advantages and disadvantages when compared with grass pasture. It requires less water, is established quicker, has a greater carrying



Clover is being grown more and more extensively on the irrigation projects.

capacity, and is a soil builder. The disadvantage is that a new field must be seeded each year for pasture the following summer, and should there be a failure in getting a stand, the farm would be without pasture the following year. A second seeding is possible in case the first one fails, so that this is not so serious as it might be. When the early seeding fails, the grain can be cut for hay and sweet clover reseeded. The following four-year rotation is a suggestion for those who wish to grow sweet clover for pasture: (1) Barley and sweet clover; (2) sweet clover pasture; (3) potatoes, corn, or sugar beets; (4) corn or sugar beets. If only 3 acres of pasture is needed, this rotation can be conducted on a 12-acre field somewhere near the yards.

Dairy cows do especially well on sweet clover pasture. With a good stand and when given proper irrigation, it will carry three large cows per acre without any additional feed except during the latter parts of the season, when if the pasture has been grazed closely it should be supplemented by hay. Usually the spring seeding has made sufficient growth to be grazed by the time the old pasture begins to fail, so that by using the new field no additional feed will be needed until the close of the pasturing season. The new field, however, should not be grazed too closely the first year. Pasturing tests conducted at the Scottsbluff Experiment Farm covering two summers show that

sweet clover is equally as good as blue grass for dairy cows. In this test eight cows were used. Four began on sweet clover and the other four on blue grass. The cows were then alternated from one pasture to the other at intervals of two weeks. Each cow was on the different pastures the same number of days. The milk record showed that the daily average of four cows was in favor of sweet clover, and the daily average of the other four was in favor of blue grass. This was true for both summers. With a good pasture crop available, the North Platte Valley should become one of the real dairy sections of the Middle West—not so much, perhaps, as a specialized industry, but as a part of the real agriculture of the valley.

During the first 10 days of February construction work at Black Canyon dam, Boise project, was seriously delayed by high water in the Payette River. Heavy rainfall on the first of the month caused a sudden rise in the river from its normal low water height of 950 second-feet to approximately 4,000 second-feet, the capacity of the by-pass channel. These heavy rains, with the addition of a moderation in temperature, brought a flood on the 8th, the river rising to 4,500 second-feet. The financial loss from the two floods will approximate \$5,000 to \$7,000, and adds another delay of four or five days to the concreting program.

FEDERAL FARM LOAN SYSTEM DESIGNED TO HELP FARMERS

Its purpose is to give the farmer the agricultural credit facilities that are enjoyed by other industries—Explanation of difficulties encountered in enforcing its provisions

THE Federal farm loan act was the first definite and constructive effort to provide for agricultural credit facilities equal to those enjoyed by other industries, according to a statement given the New RECLAMATION ERA by R. A. Cooper, Farm Loan Commissioner.

This legislation recognizes, as an elementary principle, that our general prosperity is dependent upon the production of our soil. It also recognizes that this production can not be maintained to an extent which will meet the demands of business in general unless those who toil in our fields are assured of a reasonable profit.

According to the most reliable statistics available the farm mortgage debt of the United States is in excess of \$8,000,000,000. This does not represent the entire indebtedness of the farmer. It is only that part of the debt which is secured by farm mortgage.

Speaking for the farm loan board, I want to say that we are tremendously interested in keeping the institutions under our supervision on a safe and sound basis, to the end that we may more effectively meet the needs of eligible borrowers.

The Federal land banks and joint stock land banks do not lend Government money. The Treasury of the United States supplied the initial capital of the 12 Federal land banks, but the act provided for the repayment of this capital to the Treasury from the earnings of the banks. It is believed that within 3 years all Treasury stock will be retired. For loanable funds we depend upon the sale of Federal land bank bonds. The market for these bonds and the rate of interest which the banks will be able to make to the borrowing farmer are dependent upon the soundness of our securities and the promptness with which borrowing farmers meet their amortization payments. We anticipate no serious difficulty in supplying funds in sufficient volume to meet the requirements of the various banks. It is very gratifying to state that the past seven years' experience of these institutions demonstrates not only the soundness of the plan and the need of the service, but also the ability of the farmer to meet his contract and ultimately discharge his heavy burden of debt.

It may be stated that the Federal and joint stock land banks are able to supply the long-time credit needs of agriculture secured by first mortgages on farm land. The 12 Federal intermediate credit banks

can provide funds sufficient to enable cooperative marketing associations to effectively carry out a plan of orderly marketing and also take care of such productive crops as may not be adequately provided for by commercial banks. It can not be too strongly emphasized in this connection that the intermediate credit banks are designed as permanent institutions and can not extend service except upon good security.

The Federal land banks and joint stock land banks do not receive any financial assistance from the Federal Government. They do not lend Government money. The Federal intermediate credit banks are provided with \$5,000,000 capital from the Federal Treasury. Additional loanable funds must be procured by

FARM LOAN SYSTEM AIDS AGRICULTURE

It is not believed that a system of credits will afford a complete solution of the farmers' problem. It is the purpose of this address to indicate how the Federal farm loan system has already contributed largely to general agricultural relief, and, basing my statement upon the experience of the past seven years, I have no hesitancy in saying that it will be of even greater benefit in the future if we adhere to the policies already established in the development of the system.—Hon. R. A. Cooper.

the sale of debentures. It is clear, therefore, that all of the banks must depend upon the sale of securities to supply funds to customers. It is believed that there should be no further agricultural depression due to inadequate credit facilities. It must be borne in mind, however, that credit is not the only imperative need of the farmer to-day. Agriculture is faced with the problem of producing a commodity which can not be readily sold for a price sufficient to pay the necessary cost of production and give the farmer a profit sufficient to meet his interest charges on debts already existing and to provide his family with the common comforts and conveniences of life.

It is easier, perhaps, to diagnose the trouble in this instance than to prescribe a remedy, and it is easier to prescribe a remedy than it is to apply it. I think

it is generally conceded that a better market for agricultural commodities will be developed by a comprehensive plan of cooperative marketing of all staple agricultural commodities. If cooperative marketing is to be permanently effective, it is necessary that production of a particular commodity must be adjusted to the reasonable demands of consumption. It is not as easy to control the production of raw materials as it is a manufactured article. The manufacturer can adjust his output to meet any change in consumptive requirements, but once the farmer has planted his crop his production is almost beyond his control. Unfavorable weather conditions, the ravages of crop pests can not be foreseen nor guarded against; consequently we come to the harvest period one year with an oversupply or an undersupply of a particular commodity. Notwithstanding these uncertainties, it is believed that a plan for orderly marketing, which is now being successfully carried out in respect to several of our staple commodities, can be so developed as to maintain a reasonably steady and profitable market for agriculture as a whole. Agriculture is the basis of American prosperity. A prosperous and happy agricultural population furnishes the best character of the perpetuity of our institutions. The Federal Government, as well as the State governments, can abundantly justify any plan or policy looking to agricultural regulation on the ground that it serves a public purpose.

It is not meant to suggest that a person engaged in agriculture is entitled to a special privilege. I do mean to say, however, that all industry is essentially dependent upon the production of our farmers. Agriculture suffered more by reason of deflation following the war than any other industry and has been slower in recovering.

With these thoughts in mind, the Federal farm loan board and the institutions under its supervision are trying to serve the situation. There is no reason to become pessimistic or to lose our faith. An intelligent application of the means at hand will accomplish more than will be accomplished by grieving over past losses or trying to fix the responsibility for present conditions. My message, therefore, is that we make an honest survey of our resources, determine upon a definite plan of rehabilitation, and look to the future with an abiding faith.

CROP CONDITIONS ON THE PROJECTS

THE following is a brief summary of crop conditions on the irrigation projects of the Bureau of Reclamation, Department of the Interior, at the end of February:

Yuma project, Arizona-California.—Cotton ginning was practically completed, the total number of bales ginned to February 20 being 15,403. Spring planting of cotton was well under way. About 3,400 acres of alfalfa were plowed up, most of which will be planted to cotton. The spring market for alfalfa seed opened with a good demand at 18 to 20 cents per pound. Hay and other forage brought unusually good prices owing to the extreme drought in southern California.

Orland project, California.—A considerable portion of the alfalfa crop was ready for cutting early in March. Almonds were practically all in full blossom at the close of the month with indications of a heavy yield. The continued drought resulted in an advance of \$3 per ton in the price of loose alfalfa.

Grand Valley project, Colorado.—Considerable spring plowing had started, and the farmers in general were beginning the season's work. Owing to the open season, the demand for hay decreased and the price dropped to \$11 per ton in the stack and \$15 per ton baled. It was anticipated that the sugar-beet acreage would be materially increased.

Uncompahgre project, Colorado.—Owing to weather conditions and the low price the movement of the potato crop to market was slow. The price of wheat remained steady during the month at about \$1.60 per hundredweight.

Boise project, Idaho.—Plowing was in progress throughout the month and a considerable acreage was planted to grains, clover, and early lettuce. The demand for alfalfa hay was light and a large tonnage will be carried over. Apple and potato shipments were about normal.

Minidoka project, Idaho.—Plowing, leveling, and manure spreading were under way. Another bonus payment of 75 cents per ton was made to sugar-beet growers, bringing the total to \$7.50 per ton, with other bonuses probably to follow. So far more than \$1,000,000 in cash has been distributed to the project farmers by the sugar company since last September.

Huntley project, Montana.—The Great Western Sugar Co. was trying to secure contracts for the 1924 beet crop, but owing to an objectionable clause in the contract few farmers were willing to sign

and have organized a strong beet-growers' association to handle the situation.

Milk River project, Montana.—Crop prices increased slightly. A second car of shelled corn shipped from Malta netted the grower \$1.10 per hundredweight. Owing to the open winter, the demand for hay was light.

Sun River project, Montana.—Farmers were busy baling hay, feeding stock, and plowing. The Great Northern Railroad has extended the Great Falls terminal rate on shipments of hay to Duluth and the Twin Cities to apply to Fort Shaw and Simms, making a reduction of about \$1.50 per ton and providing a market for about 100 cars of surplus hay. The result of the sugar-beet test was very satisfactory, and a number of farmers will put in a much larger acreage if the necessary hand labor can be obtained.

Lower Yellowstone project, Montana-North Dakota.—Keen interest was being shown by the farmers in the sugar-beet industry, and the acreage will be double that in 1923. Considerable hay will probably be carried over.

North Platte project, Nebraska-Wyoming.—Practically 80 per cent of the potato crop had been sold, and at the end of the month the price averaged 85 cents per hundredweight.

Newlands project, Nevada.—Shipments of large quantities of alfalfa hay continued at \$18 per ton f. o. b. cars Fallon. The

YIELD FROM COWS IS BASED UPON FEEDING

There is a definite relation between production per cow and income over feed cost, as shown by recent experiments by the Department of Agriculture.

The group that produced the most per cow ate the most on an average and always had the highest average income over cost of feed. At 100 pounds of butterfat per cow a year, the average income over cost of feed was \$10. At 400 pounds of butterfat a year, the average income over cost of feed was \$106. As production increased 4 times, the average income over cost of feed increased 10.6 times.

It was also found that, on an average, the cows that freshened in the fall and early winter produced more milk and butterfat and had a higher average income over cost of feed than those that freshened at other times of the year.

local alfalfa-meal mill operated on a two-shift basis, the output going to the Pacific coast and to New York and Boston via the Panama Canal. The large acreage of winter grain was in excellent condition.

Carlsbad project, New Mexico.—Cotton picking was completed on the 15th, and 9,500 bales were ginned for the season. About 1,000 acres of alfalfa were plowed up to be planted to cotton. Little new alfalfa was being started.

Rio Grande project, New Mexico-Texas.—Farmers were active in clearing and leveling new land. Indications pointed to a decrease in the alfalfa acreage and a marked increase in the cotton acreage. The cotton growers in Mesilla Valley were perfecting a strong producing organization, and were preparing to concentrate on the production of Acala cotton.

Williston project, North Dakota.—Hay is the only crop of which any considerable portion remained unmarketed.

Umatilla project, Oregon.—Owing to the open winter and early spring, the market for hay was poor. Preparations were being made to plant asparagus and strawberries in a concerted movement toward diversification. Alfalfa had started growth, and fruit trees were about to blossom.

Klamath project, Oregon-California.—Much of the plowing and other spring work had been completed. Only a small quantity of hay had been fed, and probably more than the average amount will be carried over.

Belle Fourche project, South Dakota.—It was anticipated that there will be an increased acreage in sugar beets on land adjacent to the railroad owing to the more favorable contract offered by the sugar company.

Strawberry Valley project, Utah.—Spring plowing had begun, but was stopped because of exceptionally dry soil conditions. The crop census of 1923 showed that the gross financial returns exceeded those of the previous year by about 20 per cent.

Okanogan project, Washington.—A few cars of apples still remained on the project. The market continued weak.

Yakima project, Washington.—Apples were being sent to market from storage with scarcely any profit to the growers. The potato market picked up a little and supplies were moving out. Mild weather reduced the demand for hay, and a large part of the 1923 crop will be carried over. The water users were well ahead with pruning, plowing, and planting.

Shoshone project, Wyoming.—Farmers were engaged chiefly in hauling hay; 141 cars of baled alfalfa were shipped during the month. Little progress was made on signing up the 1924 sugar-beet acreage.

ANIMAL DISEASE BREAKS OUT

FOOT-AND-MOUTH disease, from which the United States has been free since 1916, has made its appearance in California. The Secretary of Agriculture has declared a quarantine on the counties of Alameda, Contra Costa, and Solano, and the Bureau of Animal Industry, in cooperation with the livestock sanitary authorities of California, is taking steps to prevent the spread of the disease and to stamp out the infection.

The disease, which is one of the most universal maladies of cloven-footed animals, was first found in a large herd of dairy cattle near Oakland and is now known to be present on six premises within the quarantined area. On these farms are some 600 head of cattle and 200 head of hogs. How the infection gained entrance to the country has not yet been determined, but State and Federal inspectors are making every effort to trace all movements of animals, the source of recent additions to the herds, shipments from these farms, the movements of new employees, and the source of purchased feed. Such precautions are being taken

in order to watch for other possible outbreaks.

Instructions have been sent by the Department of Agriculture to all persons whose duty it is to assist in preventing the spread of animal diseases and to farmers in the region where the outbreak has occurred. "It is the prime duty and privilege of livestock owners," says one of these circular letters, "to fully cooperate with State and Federal officers in the quarantine and slaughter of affected and exposed animals, in the disinfection of infected premises, and in all other measures essential for checking the spread of the disease and accomplishing its eradication." On farms where infection is found no livestock can be moved, dogs are not allowed to run at large, and the farmer and his family are not to visit other farms. No farm products can be moved from these farms.

Although foot-and-mouth disease is primarily a disease of cattle, other farm animals are susceptible in varying degrees. It is not so malignant as some other diseases, but it causes great losses because of

its extreme contagiousness which makes its spread rapid, and for this reason prompt and rigorous control measures are necessary to protect the livestock industry of the entire country. In most European countries it has gained such a foothold that it has probably become a permanent infection. Great Britain has fought off many outbreaks and is now engaged in one of its hardest fights to protect its livestock from the scourge. The United States has suffered seven previous outbreaks and has succeeded in eradicating them before they have spread very widely. The worst outbreak was in 1914, when it gained considerable headway before being recognized, and a year and a half of strenuous effort was necessary to stamp it out.

A later announcement made by the Department of Agriculture was to the effect that the outbreak of the foot-and-mouth disease was considered under control. Spread of the disease beyond the four counties where the infected herds of cattle had been found was also declared improbable. Vigorous and prompt action of the Federal and State livestock sanitary officials was responsible for a quick checking of the infectious disease.



A wagon load of oranges from one of the many groves on the Salt River project.

NOTES FROM RECLAMATION PROJECTS

THE Grand River Valley Railroad Co., operating an interurban line between Grand Junction and Fruita, Grand Valley project, has announced that construction will be started immediately on a branch line 10 miles in length to tap a large area in the project north of Fruita. The purpose of the extension is to encourage the growing of a larger acreage of sugar beets.

The Orland Kadota fig growers are planning to install one unit of a fig-preserving plant for handling the 1924 crop. The capacity of the contemplated unit to be located at Orland is $1\frac{1}{2}$ tons daily. Of the 350 acres of Kadota figs in the Orland vicinity, 300 acres will be in bearing during the season of 1924, yielding an estimated production of 100 tons.

Unusually warm weather on the Yakima project in February started vegetation growing and reduced the amount of water in storage in the snow fields to below normal. A chinook wind on February 13, accompanied by rainfall at the lakes, varying from $1\frac{1}{2}$ to $1\frac{1}{4}$ inches, resulted in a peak run-off of the Yakima River of 19,000 second-feet.

The production of alfalfa meal on the Newlands project affords a means of marketing some of the surplus loose hay. A mill at Fallon which has been in operation since September 1, 1923, turned out 2,000 tons of meal to the end of the year. The product is shipped to the New York and Boston markets via San Francisco and the Panama Canal and returns approximately \$5 per ton more than baled alfalfa.

A total yield of 142,000 tons of sugar beets was grown on the Minidoka project last year, and the farmers so far have been paid more than \$1,000,000 for the 1923 crop, with prospects for an additional bonus.

Five cheese factories on the Minidoka project manufactured more than 1,000,000 pounds of cheese during 1923. The average price received was 21 cents per pound.

The final crop yield report for the year 1923 on the Carlsbad project shows a total crop value of \$1,781,400, or \$78.70 per acre, compared with \$1,198,000, or \$53.41 per acre, in 1922.

A number of prospective settlers have been brought to the Grand Valley project from the sugar-beet districts of northern Colorado through the Holly Sugar Corporation.

A. E. Carlton, head of the Holly Sugar Corporation, has announced that he will finance beet growers on the Grand Valley project in the purchase of dairy cows. He proposes to bring in a number of purebred cows and sell them to reliable farmers on long-time payments to be made from a percentage of the cream checks.

The Mapleton and Springville irrigation districts of the Strawberry Valley project are upholding their good record by the payment in full of the 1923 construction and operation and maintenance charges, amounting to \$21,983.75.

Almond groves on the Orland project present an attractive picture of white

blossoms intermingled with the green foliage. The prolific blooming predicts a heavy yield of nuts.

The total collections on the Yuma project for February amounted to \$136,737.20.

The final crop yield report for the Orland project shows an average return of \$54.40 per acre for the 12,418 acres cropped during 1923. This is an advance of \$6.48 per acre over the return for 1922.

Business men and others interested in the development of the Yuma Mesa held a meeting recently, at which it was decided to organize a development company, and a committee was appointed to proceed with the organizing of a corporation along these lines. This marked another step in the development of the Mesa.

The advantages of a good cropping system for the farmer who is feeding several classes of livestock under average farm conditions can not be too greatly emphasized.

Those crops that can be grown cheaply and well on his own farm usually constitute the most economical feeds that the livestock feeder can use.



Packing apples on the Grand Valley project

BUFFALO BILL STARTED PROJECT

ALTHOUGH it is not generally known, Buffalo Bill, whose real name was Col. W. F. Cody, undertook one of the biggest private projects in the history of the United States back in the year 1899.

Under the Carey law then in force before the present Reclamation Bureau was established, the State Government of Wyoming secured the segregation for irrigation purposes of lands in Big Horn County, which included a tract of 60,000 acres north of the Shoshone River and a tract of 24,000 acres south of the stream.

On May 29, 1899, Buffalo Bill associated with Nate Salisbury, acquired from the State the right to appropriate a part of the waters of the Shoshone River for the reclaiming of the 60,000-acre tract on the north side of the river. For several years abortive attempts were made by Colonel Cody and his partner to construct canals and establish an irrigation project, but on account of the magnitude of the enterprise and the lack of sufficient capital the necessary works were never built.

Finally on January 26, 1903, after the Federal Government had passed the law establishing a fund for the building of reclamation projects and the Secretary of the Interior had provided the necessary machinery, Governor Richards, of Wyoming, proposed that the Cody tract be turned back to the United States. Similar requests were made by various citizens and other officials that the Reclamation Bureau undertake the construction of an irrigation project on these lands.

On February 13, 1904, Buffalo Bill, the surviving partner of the firm of Cody and Salisbury, transferred to the Secretary of Interior all rights to appropriate waters from the Shoshone River. This was the end of the attempt of the famous Indian fighter to become a master irrigationist.

After these lands were released the Government began the construction of a large dam on the Shoshone River and has since built canals and laterals. The enterprise, which was once known as the "Cody Project," now bears the name of the "Shoshone Project" and is one of the 24 now operated by the Government.

APPOINTS MANAGER OF BELLE FOURCHE

Appointment of F. C. Youngblutt, appraiser of the Omaha Federal Local Bank, as project manager of the Belle Fourche reclamation project in South Dakota, has been announced by the Department of the Interior.

He succeeds B. E. Hayden, who recently was promoted from the Belle Fourche project to the Denver office of the Bureau of Reclamation, where he assumes the post of industrial agent under the field commissioner.

The new appointee was connected with the Reclamation Service for a period of 16 years. He entered the service in 1906, was made junior engineer in 1907, assistant engineer in 1910, and was advanced to engineer in 1920. He resigned in 1922, accepting employment in private life. For a number of years Youngblutt served as engineer on the Lower Yellowstone project in Montana and later was in charge of operation and maintenance work on the Belle Fourche in South Dakota.

The board of directors of the Belle Fourche irrigation district, representing the farmers and settlers on the project,

requested and endorsed the appointment of Youngblutt before his selection was finally made by the Interior Department.

NEED SPECIALIZATION IN POULTRY BUSINESS

There is a broad field for specialization by farmers in producing table poultry of prime quality. Most poultry is shipped alive by producers because producers are not skilled in dressing and are not equipped to handle and ship the dressed poultry in good condition over long distances.

Shippers of dressed poultry will find it profitable as a rule to fatten the birds for a period of 10 to 14 days before killing. Requirements of the market to which the poultry are sent should determine whether the birds should be scalded or dry picked and also the style of dressing. It is extremely important that the birds be well bled and thoroughly chilled immediately after slaughter to remove all body heat.

Failure to chill properly is often responsible for spoilage. In warm weather dressed poultry should be shipped packed in ice to prevent spoilage in transit. Grading for quality, uniformity, and size is desirable. Shipping of poor-quality birds in separate packages is also desirable when the quantity to be shipped is sufficiently large to make this step practicable.

It probably will not pay to fatten poultry that is in fairly good condition of flesh before shipping them alive, because shrinkage in weight of specially fattened poultry is likely to be heavy during the journey to market. But if the poultry is very thin it will probably pay to fatten the birds for a few days or a week.



Interior of a preserving factory on the Grand Valley project

WESTERN IRRIGATION LAW

WHERE a California farmer who irrigated his own land from a well supplied his neighbors with water when there was a surplus, charging a sum merely sufficient to pay for the electricity consumed in pumping the water from the ground, and there was no evidence of an intention to dedicate the water to a public use, the irrigation system would not be subject to the jurisdiction of the California Railroad Commission. (*Klatt v. The California Railroad Commission (Calif.)*, 221 Pac. 926.)

In Lincoln County, Nebr., the Union Pacific Railroad Co. permitted neighboring landowners to divert a continuously running stream to its property, and then proceeded to discharge the diverted water upon the land of another by opening and enlarging a ditch to which it had acquired a prescriptive right for the purpose of diverting surplus water from its property. The party upon whose land the diverted water was discharged brought suit against the railroad company and recovered damages. The Supreme Court of Nebraska, to which the case was carried on appeal, held, citing *Kane v. Bowden*, 85 Nebr. 347, 123 N. W. 94, that except in the exercise of the power of eminent domain water flowing in a well-defined water course, in its primitive condition, may not be lawfully diverted to the land of a lower proprietor where it is not wont to run according to natural drainage. Surface water, however, is deemed the common enemy, and a landowner may repel it, even to the damage of his neighbor, if the means employed by him be not negligent. (*Norris v. Union Pacific R. R. Co. (Nebr.)*, 196 N. W. 924.)

It is a matter of common knowledge in the judicial districts of Montana, where irrigation has been practiced since the earliest days, that extravagant quantities of water were awarded the litigants by the courts. The quantity of water which may be claimed lawfully under a prior appropriation is limited to that quantity within the amount claimed which the appropriator has needed and which within a reasonable time he has actually and economically applied to a beneficial use. A right of appropriation does not accrue until the appropriator puts the water to a beneficial use, though prior thereto he does some work on the ditch. The appropriator does not own the water,

but has a right of ownership in its use only. In determining the duty of water, the court should ascertain the quantity which is essential to irrigate economically but successfully the tract of land to be irrigated, and, though emphasis should be placed on economy of use, economy should not be insisted upon to such an extent as to imperil success. (*Allen v. Patrick (Mont.)*, 222 Pac. 451.)

A contract by an irrigation district in Oregon to furnish a city surplus water over and above the needs of the district is not illegal because it does not restrict the use of the water to irrigation, as the law contemplates the beneficial use of all water over and above the needs of the district. Nor is such a contract illegal because it places the city, a nonmember, on an equal footing with the members of the district in case of a shortage of water, the city being a common user along with the individual owners and being required to pay its proportionate share of expense for all that it acquires. (*Butler & Thompson Company v. City of Ashland et al. (Oreg.)*, 222 Pac. 346.)

Where a water company in the State of Washington sold water rights and agreed to furnish water at a certain annual charge, the purchase price to be a lien on the land, but became insolvent and conveyed its property without obligating its grantee to perform the contract, and is not able to comply with the contract, and an irrigation district purchasing the property of the water company can only supply the water at ten times the annual fixed charge, an assignee of the water company can not claim a valid lien for the purchase price of a water right. (*Black v. Baker (Wash.)* 219 Pac. 59.)

Where the evidence tended to show that there was more than 600 feet of water available in a Colorado irrigation project, that the water in excess of that amount was not used, and defendant's ditch would not carry it, and that for a period of 30 years defendant did not act on the theory that it could be delivered, a strong presumption of abandonment was raised, and the determination of the trial court that such presumption was not rebutted will not be disturbed on appeal. (*Northern Colorado Irr. Co. v. Burlington Ditch, Reservoir & Land Co. (Colo.)*, 219 Pac. 1071.)

A discrimination in fixing rates for water for irrigation based upon reason and justice can properly exist. The California Railroad Commission may divide into two classes, the ordinary consumers of water from a canal company and the contract consumers from such company, and require the latter to pay rates for all acreage covered by their contracts as therein provided, though the ordinary consumers are not so required to pay, a lower rate per acre being fixed for the contract consumers. (*Live Oak Water Users Association v. Railroad Commission of State of California (Calif.)*, 219 Pac. 65.)

Where an irrigation district in Idaho has contracted to purchase a water right under a Federal irrigation project, the assessments to pay the construction charges under said contract are to be levied as provided for in Idaho Compiled Statutes, sections 4382 and 4387, and the district has no right to levy such an assessment and sell the land for delinquency until after confirmation of the apportionment of benefits. But as to assessments to pay operation and maintenance charges under such a contract, the district may levy same prior to the proceedings to confirm apportionment of benefits. (*Haga v. Nampa and Meridian Irrigation District (Idaho)* 221 Pac. 147.)

A party owning a paid-up water right and a proportionate interest in the inefficient canal system of a Carey Act project in Idaho through its agents participated in the organization of an irrigation district for the purpose of obtaining a loan of \$1,000,000 from the Federal Government to reconstruct and improve such canal system had notice of all subsequent proceedings by which such loan was obtained, and offered no objection thereto, knew when actual work was begun on reconstructing and improving such canal system, and knew of the progress of such work for more than a year prior to the levying of assessments for benefits and offered no objection to such work or expenditure until the district court was petitioned to confirm such assessments more than a year after the work had begun and a large proportion of the loan had been expended and great benefits to the canal system had thereby been secured: Held, that such party is estopped to object to the assessments of benefits against its land to repay such loan on the ground that the irrigation district had not acquired ownership of the canal system prior to the levy of such assessments. (*In re King Hill Irr. Dist. King Hill Irr. Dist. v. Craster Farm & Orchard Co. (Idaho)*, 221 Pac. 839.)

CONTROL APPLE SCALD AND IMPROVE PRODUCT

Scald is one of the most serious storage and market diseases of the apple and has an important bearing on all market operations during the latter half of the apple-storage season, according to a Farmers' Bulletin issued by the Department of Agriculture. Its control is outlined as follows:

Susceptibility to scald varies with the season and with orchard conditions and management. Early picked and poorly colored fruit is extremely susceptible to scald, whereas well-colored, well-matured apples are more resistant to the disease.

Low temperature and prompt cooling are of first importance in delaying the development of scald.

Aeration is a preventive of scald, the success of the treatment varying with the thoroughness with which it can be carried out. Aeration during delayed storage is particularly important and valuable.

Storing the fruit in hampers, ventilated barrels, or baskets decreases the development of scald. Conversely, storing it in tight barrels and tight stacks favors the development of the disease.

Oiled wrappers are the most complete preventive of scald that has been found. They have eliminated the disease as a market factor in all but 2 of the 80 commercial tests that have been made.

Oiled blotter material scattered between the apples has reduced scald, but has been far less efficient in controlling the disease than the oiled wrappers.

PLAN PROPOSED TO ADVERTISE PROJECT

A short time ago the idea of advertising the Umatilla project, Oregon, was presented to the Hermiston Commercial Club. It is planned to set up billboards along the highway, on which will be a statement of the resources of the project and an urgent invitation to tourists to visit the reservoir and other local places of interest. Descriptive literature showing scenes on the project will also be distributed.

It was suggested that effort be made to interest the other towns on the Umatilla project in the advertising campaign, as by so doing a more extensive program can be worked out.

In this connection Mr. E. P. Dodd, of Hermiston, said that "by spring it is estimated that 10,000 tourists every day will leave California headed in this direction. A number of them are looking for a location. We can never hope to interest them unless we advertise. A good many tourists pass through the project every year, never realizing that we have a territory rich in the production of hay and other products."

Scald has been reduced by coating the skin of the apple with oil, but it has not been found possible to carry out the treatment without injuring the appearance of the fruit.

IRRIGATION DISTRICT HAS MANY ADVANTAGES

"It would seem," said J. W. Taylor, president of the Elephant Butte irrigation district, Rio Grande project, recently, in commenting on the comparative costs of various districts, "that our change to the irrigation district form of organization, with the consequent taxation of idle land for operation and maintenance expenses, is the most vital factor in securing a relatively low taxation, or, in other words, in decreasing the burden of the farmer who is actually working his land as against the speculative farmer who is waiting for somebody else to create his values. It suggests, also, that the irrigation district form of government with its future policy remaining as in the past, that of taxation of idle land in so far as possible, will be the most potent factor in bringing idle land into cultivation, thereby creating additional taxation values and lightening the load that the individual acre bears, not only in matters pertaining to irrigation but also in State and county taxation.

"At the same time the irrigation district form of government promotes a condition whereby the community can more promptly and with more economy secure road and school development, which is necessary for our present needs and to promote future settlement of the district."

DISEASES AND INSECTS OF GARDEN VEGETABLES

From the time the seeds of garden crops are put into the ground until the crops are gathered, diseases and insects may appear that must be fought. Vegetable troubles are due to numerous causes, including unfavorable soil conditions, too wet or too dry, too rich or too poor, lack of humus or of lime, weather unsuited to some crops, careless use of fertilizers, or attacks of fungi or other parasites. The adoption of the best horticultural practice—crop rotation, the careful application of fertilizers suited to each crop, adequate cultivation, the planting of all crops in their proper season—is important for the successful growing of garden crops. The control of diseases due to fungi, bacteria, and other enemies requires special additional treatment, as does the damage caused by insects.

The purpose of Farmers' Bulletin No. 1371, recently issued by the Department of Agriculture, is to present briefly control measures for the more important insects and fungous and bacterial diseases of the home-garden vegetable crops.



Stream gager at work.

ADMINISTRATIVE ORGANIZATION OF THE BUREAU OF RECLAMATION

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FRANCIS M. GOODWIN, Assistant Secretary.
JOHN H. EDWARDS, Solicitor for the Interior Department.
EBERT K. BURLEW, Administrative Assistant to the Secretary.
JOHN H. MCNEELY, Assistant to the Secretary.
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WASHINGTON, D. C.

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PROJECT ORGANIZATION.

Belle Fourche Project.—F. C. Youngblutt, project manager, Newell, S. Dak.; R. C. Walber, chief clerk.

Boise Project.—J. B. Bond, project manager, Boise, Idaho; E. R. Mills, chief clerk; C. F. Weinkauf, fiscal agent.

Boise Project, Black Canyon Dam.—Walter Ward, construction engineer, Emmett, Idaho; M. J. Gorman, chief clerk, T. W. Hause, fiscal agent.

Carlsbad Project.—L. E. Foster, project manager; Carlsbad, N. Mex.; V. L. Minter, chief clerk and fiscal agent.

Grand Valley Project.—S. O. Harper, project manager, Grand Junction, Colo.; W. J. Chiesman, chief clerk, C. E. Brodie, fiscal agent.

Huntley Project.—A. R. McGinness, project manager, Ballantine, Mont.; H. S. Elliott, chief clerk; Miss M. C. Simek, fiscal agent.

King Hill Project.—George H. Harris, acting project manager, King Hill, Idaho; E. V. Hillius, chief clerk and fiscal agent.

Klamath Project.—H. D. Newell, project manager; Klamath Falls, Oreg.; N. G. Wheeler, chief clerk; G. R. Barnhart, fiscal agent.

Lower Yellowstone Project.—H. A. Parker, project manager, Savage, Mont.; E. R. Schepplamm, chief clerk.

Milk River Project.—G. E. Stratton, project manager, Malta, Mont.; E. E. Chabot, chief clerk; J. T. M. Culbertson, fiscal agent.

Minidoka Project.—E. B. Darlington, project manager, Burley, Idaho; E. C. Diehl, chief clerk; Miss A. J. Larson, fiscal agent.

Minidoka Project, American Falls Reservoir.—F. A. Banks, engineer in charge, American Falls, Idaho; H. N. Bickel, chief clerk O. L. Adamson, fiscal agent.

Newlands Project.—J. F. Richardson, project manager, Fallon, Nev.; A. W. Walker, engineer; G. B. Snow, chief clerk; Miss Ethel M. Simmonds, fiscal agent.

North Platte Project.—Andrew Weiss, project manager, Mitchell, Nebr.; H. W. Bashore, engineer, Fort Laramie Division; T. W. Parry, irrigation manager; L. H. Mong, chief clerk V. E. Hubbell, fiscal agent.

Okanogan Project.—Calvin Casteel, project manager, Okanogan, Wash.; W. D. Funk, chief clerk and fiscal agent.

Orland Project.—R. C. E. Weber, project manager, Orland, Calif.; E. T. Eriksen, engineer; C. H. Lillingston, chief clerk and fiscal agent.

Rio Grande Project.—L. M. Lawson, project manager, El Paso, Tex.; C. A. Peavey, chief clerk; L. S. Kennicott, fiscal agent.

Riverton Project.—H. D. Comstock, project manager, Riverton, Wyo.; L. H. Mitchell, engineer; R. B. Smith, chief clerk; Henry Berryhill, fiscal agent.

Salt River Project.—Being operated by the Salt River Valley Water Users' Association; C. C. Cragin, general superintendent and chief engineer, Phoenix, Ariz.

Shoshone Project.—J. S. Longwell, project manager, Powell, Wyo.; J. R. Iakisch, engineer; C. M. Jump, superintendent of irrigation; W. F. Sha, chief clerk; Mrs. O. C. Knights, fiscal agent.

Strawberry Valley Project.—W. L. Whittemore, project manager, Provo, Utah; H. R. Pasewalk, chief clerk; W. C. Berger, fiscal agent.

Sun River Project.—G. O. Sanford, project manager, Great Falls, Mont.; H. W. Johnson, chief clerk; F. C. Lewis, fiscal agent; G. A. Benjamin, irrigation manager, Fairfield, Mont.

Umatilla Project.—H. M. Schilling, project manager, Hermiston, Oreg.; G. C. Patterson, chief clerk; Miss M. G. Valentine, fiscal agent.

Umatilla Project, McKay Dam.—R. M. Conner, superintendent of construction; Ralph Lowry, engineer in charge, McKay Dam, Oreg.; C. B. Funk, chief clerk; W. S. Gillogly, fiscal agent.

Uncompahgre Project.—L. J. Foster, project manager, Montrose, Colo.; G. H. Bolt, chief clerk; F. D. Helm, fiscal agent.

Williston Project.—W. S. Arthur, project manager and chief clerk, Williston, N. Dak.; H. C. Melaas, fiscal agent.

Yakima Project.—J. L. Lytel, project manager, Yakima, Wash.; R. K. Cunningham, chief clerk; J. C. Gawler, fiscal agent; M. D. Scroggs, superintendent of irrigation, Sunnyside, Wash.; J. S. Moore, superintendent of irrigation, Route 6, Yakima, Wash.

Yakima Project, Tieton Dam.—F. T. Crowe, construction engineer, Rimrock, Wash.; C. F. Gleason and W. C. Christopher, engineers; V. G. Evans, chief clerk; C. F. Williams, fiscal agent.

Yuma Project.—P. J. Preston, project manager, Yuma, Ariz.; R. M. Priest, superintendent of construction; D. C. McConaughy, engineer, Yuma Mesa Division; D. C. Caylor, superintendent of irrigation; C. A. Denman, chief clerk; E. M. Philibaum, fiscal agent.

INDIAN PROJECT

Flathead Project.—C. J. Moody, project manager, St. Ignatius, Mont.; J. P. Siebeneicher, chief clerk and fiscal agent.

FIELD LEGAL OFFICES.

Boise, Idaho.—B. E. Stoutemyer, district counsel. Projects: Boise, Minidoka, King Hill, and Jackson Lake Enlargement.

Denver, Colo.—Legal section, offices of chief engineer and field commissioner; R. M. Patrick and Armand Offutt, district counsel.

El Paso, Tex.—J. N. Beardslee, district counsel. Projects: Rio Grande, Carlsbad, and Hondo.

Helena, Mont.—E. E. Rodds, district counsel, Helena, Mont. Projects: Flathead, Huntley, Milk River, St. Mary Storage, Sun River, Williston, Lower Yellowstone, and Shoshone.

Mitchell, Nebr.—Brooks Fullerton, district counsel. Projects: North Platte, Belle Fourche, and Riverton.

Montrose, Colo.—J. R. Alexander, district counsel. Projects: Grand Valley, Uncompahgre, and Strawberry Valley.

Portland, Oreg.—....., district counsel, Post Office Building. Projects: Yakima, Okanogan, Umatilla, Klamath, and Baker.

San Francisco, Calif.—P. W. Dent, district counsel, 349 Pacific Building. Projects: Salt River, Yuma, Orland, and Newlands.

THE NEW RECLAMATION ERA is published every month by the Bureau of Reclamation of the Department of the Interior, Washington, D. C. It is printed by the Government Printing Office, Washington, D. C.

Copies of the **NEW RECLAMATION ERA** are sent regularly without direct charge to the water users of the reclamation projects constructed and operated by the Government. Persons desiring to subscribe for the **NEW RECLAMATION ERA**, other than water users, may secure it for the price of 75 cents per year, payable in advance. Subscriptions should be sent to the Chief Clerk, Bureau of Reclamation, Washington, D. C., and remittances in the form of postal money order or New York draft should be made payable to the Special Fiscal Agent, Bureau of Reclamation. Postage stamps are not acceptable in payment of subscription.

FOR the fiscal year of 1922 appropriations for the Department of the Interior amounted to \$350,000-000; for the next fiscal year, 1923, they were reduced to approximately \$327,000,000, or a decrease of \$23,000,000; and for the present fiscal year of 1924 the department is operating under an appropriation of \$325,000,000. These reductions represent a direct saving to the taxpayers of the United States.

But even with these annual reductions, it has been found possible in accordance with the expressed policy of the Administration to announce a further decrease of an amount in excess of the entire savings of the previous three-year period. For the fiscal year ending July 1, 1925, the budget estimate finally submitted to Congress provided for the expenditure of \$299,312,000 for the operation of the Interior Department, which is \$26,500,000 less than was appropriated last year and \$51,203,000 less than was appropriated for the fiscal year 1922. These reductions were effected without impairment of service. On the contrary, the public benefited in many instances by a more direct transaction of business.

NEW RECLAMATION ERA

VOL. 15

MAY, 1924

NO. 5



CORN GROWN ON THE YAKIMA PROJECT, WASHINGTON

DR. ELWOOD MEAD HEADS BUREAU

DR. ELWOOD MEAD, Professor of Rural Institutions of the University of California, was appointed Commissioner of Reclamation by Secretary of the Interior Work on April 3. His selection was made after he had been granted a leave of absence from his duties at the university.

Doctor Mead returned in December from a six months' service as Consulting Engineer in Australia in the planning of irrigation and development and study of land settlement in connection with a commission appointed by the British Government.

He has had a lifelong experience in irrigation administration, beginning as Assistant State Engineer of Colorado, then State Engineer of Wyoming, then Chief of Irrigation and Drainage Investigations of the United States Department of Agriculture, Chairman of the State Rivers and Water Supply Commission of Australia, Consulting Engineer of the Interior Department, and a number of countries in which irrigation is an important problem.

Doctor Mead is a graduate in engineering and agriculture of Purdue University and of Iowa State College, a member of the American Society of Civil Engineers and other engineering bodies, and an honorary member of the American Society of Agricultural Engineers. Since last December he has been engaged with the Advisory Committee on Reclamation reorganizing that service in the Interior Department.

Doctor Mead has already taken up his duties and will put in operation the new policies developed by this committee and the Secretary of the Interior, who will promulgate them as rapidly as practicable.

A division of finance has been created in the bureau intended to separate the handling of receipts and disbursements from the engineering and agricultural divisions. Over 25 millions in accounts are now classed as deferred, doubtful, and bad. An attempt will be made to develop a system that will recoup these losses if possible and obviate or minimize these leaks in the future. Former Commissioner D. W. Davis becomes director of this important division of the service.

The report of the Advisory Committee on Reclamation has enlarged and completed the reorganization scheme of the Reclamation Service initiated a year ago. It has involved a greater diversity of duties, making it advisable to continue a member of this Advisory Committee which has made an intensive six months' study of reclamation, to insure the application of the readjustments suggested by this report.

The highest qualifications obtainable, it is believed, have been secured in Doctor Mead.



Dr. Elwood Mead, Commissioner of the Bureau of Reclamation

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NEW RECLAMATION ERA

Issued monthly by the Department of the Interior, Bureau of Reclamation, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 15

MAY, 1924

No. 5

IMPENDING RECLAMATION DISASTER MAY BE AVERTED

Special Advisory Committee in comprehensive report declares that prompt action by Congress to correct conditions will bring about lasting success

THE situation that has developed on the Federal reclamation projects, declares the report of the Special Advisory Committee on Reclamation made on April 10 to the Secretary of the Interior, is serious. Three projects, it continues, have been abandoned, and unless remedial measures of a permanent character are applied, several more will fail; and the Federal reclamation experiment, conceived in a spirit of wise and lofty statesmanship, will become discredited.

The net construction cost of the projects, subject to repayment as of June 30, 1923, is in round numbers \$143,000,000. Of this amount about \$101,000,000 are covered by active water-right contracts; \$39,000,000 unsecured by water contracts.

The water users holding water-right contracts have repaid, during the existence of the Reclamation Service, 10.9 per cent of the total construction cost subject to the repayment. On June 30, 1923, of the construction charges then due, 14.2 per cent, or \$2,537,222.46, remained unpaid, and of the operation and maintenance charges then due, 17.6 per cent, or \$2,423,649.06, remained unpaid.

We believe it possible, without departing from the intent of the reclamation act, and by using the results of the experience of the last 21 years, to correct conditions on the projects so that impending disaster may be replaced by lasting success. This will require prompt action, for the present situation has grown to such proportions, throughout two decades, that it can no longer be met by temporary relief measures. The causes of dissatisfaction and failure must be eliminated.

The law required expenditures to be made in the 15 States mentioned therein in proportion to the sales of public land within those States; and insistent demands were made for immediate selections in each of those States. Studies of water flow and reservoir sites had been made, and some consideration given to soil conditions before the passage of the

THE project settlers, particularly on the public lands, were unselected as to fitness by experience or financial ability to undertake irrigation farming. Many entered on the venture with little conception of the expenses or physical obstacles they would meet in creating a farm. It was a situation which made the agricultural needs of this heterogeneous body of water users the most important factor in this development. The inexperienced farmer should have been given more and better information and advice; the poor farmer, with honest courage but little or no capital, should have been provided with proper facilities; the farm, with a rough, rolling surface should have been leveled; the greedy owner of private lands, ready to trade upon the natural desire of vigorous, hard-working men, for independent homes, should and could have been squelched; the good farmer, with small business capacity, should have been given the assistance of cooperative organizations for buying and selling; all should have been supplied with intimate advice, from competent official advisers, on all farm matters; and by every effort the way should have been made easier for the water user, who not only profits by the labor and skill of the engineer, but who also absorbs engineering mistakes and pays engineering bills. Such a singleness of purpose in winning project success by helping the farmer would have brought greater success to the projects, avoided the present danger, and would early have uncovered needed changes in policy or methods.

law, yet sufficient accurate information regarding agricultural and economic feasibility had not been obtained upon which

to justify the selection of each of the 24 projects which were located within four years after the passage of the law. Some projects were authorized which should never have been undertaken. The simultaneous construction of more than 20 projects, involving the expenditure of nearly \$150,000,000, provided no background of experience for the construction of the projects, such as would have been acquired by a more gradual and orderly program of development. This huge construction program soon exhausted the reclamation fund and made necessary a loan of \$20,000,000 from Congress to keep the work moving. Thus, construction was done piecemeal and over many years. The delayed construction and the irreparable errors in the original locations increased the project costs and the burden of the water users, who were to repay construction costs from crop incomes.

The construction costs are in almost every instance larger, in some cases several times larger, than the original estimates. This fact, while regrettable, can not be charged to any one cause. One principal cause was including works not provided for in the original estimates, such as larger dams, also lateral ditches and drainage works. Many of these works are of a monumental character such as high dams and long tunnels, in which unforeseen obstacles were encountered. Whatever the reason may have been, many farmers feel they have been called upon to pay more than they expected to pay and more than they were told they would have to pay; this has become a source of constant attack upon the Reclamation Service and of discontent among water users. Estimates should be made with such care, and construction pushed with sufficient rapidity, to secure reasonable agreement between estimates and costs.

Success can come to future Federal reclamation ventures only if projects are authorized upon a thoroughly scientific

(Continued on page 68)

PRESENT REPAYMENT PLAN INELASTIC AND UNSCIENTIFIC

Acre cost and crop-producing power vary greatly among various projects making it necessary to determine the annual payments in accordance with the productivity of soil

(Continued from page 67)

consideration of the probable power of the project to enable the farmer to repay construction costs and to win a living from the irrigated lands. Community and political demand to secure projects should be considered only after full knowledge of the feasibility of a proposed project has been secured. Once a project is located, the errors in the choice are felt to the last day. The relief that can now be afforded on existing projects is to classify the lands upon the basis of a scientific survey and place equitable charges upon each class in proportion to its power to produce.

Delayed payments or no payments and the present plight of settlers are not due wholly, however, to increased project costs. Reclamation by irrigation is the result of the joint efforts of the engineer and the farmer. The engineer builds the irrigation works; the farmer must pay for the works and make a living from the reclaimed lands. The major part of the engineers' task is soon over; the farmers' task lasts while the works endure. There can be no irrigated farm without the competent engineer; but there will be no payment for the works nor community development under them without the successful farmer. The engineering structures of the Federal irrigation projects have been substantially built and maintained; but the farmers' needs have been incompletely met. A fundamental error was made in believing that the construction of irrigation works would of itself create irrigated agriculture. The reclamation act was based on that assumption. Attention has been centered almost entirely on engineering features; settlers were accepted without capital or experience. They were not organized to work together, but were left to struggle without sufficient aid or direction to complete what the Government had only begun. It has been demonstrated that the Government can build irrigation structures of the highest quality; but how farmers on the Federal irrigation projects can repay the cost of these structures within reasonable time limits, is yet to be demonstrated. The over-emphasis of the engineering side of reclamation by irrigation is one cause of project difficulties.

The Reclamation Service has retained the full management of all but two of the projects. This has not been satisfactory. The project management and the Washington office have become targets for criticism. A dependence on Federal paternalism has settled down upon nearly all the projects, and a corresponding bureaucratic tendency has grown up

IT IS idle to assume that lands of equal fertility can bear widely different annual construction payments, or that all lands—good, indifferent, or poor—under a single project can bear the same annual construction payments, yet the existing plan of repayment was based upon that assumption. Neither time nor an arbitrarily fixed per cent of cost is a sound basis for determining annual payments. Whether the total construction cost be great or small, it can only be paid out of the produce of the lands; hence, productivity is the only safe and fair basis for fixing annual payments. The expense of changing rough desert land into irrigated fields, and of adding the new implements and improvements needed, involves a large outlay of money which must be won from the products of the farm. The acre income becomes the basis of any scientific method of repaying construction costs. The more fertile the soil is, the higher may be the annual charge; and the more intelligently the farmer cultivates the soil, the sooner will till to his water right pass to him. The present method of repayment can not and does not insure a steady return on the investment by the Government in irrigation structures, and can not be met by the projects with lower productive capacity. It will be necessary to put into effect a new plan of repayment of construction costs of the Federal irrigation projects—in our opinion one based upon the inherent power of the soil, under intelligent cultivation, to produce crops.

within the Reclamation Service. The water users have come to look upon themselves as wards of the Government, a specially favored class with special claims upon Governmental bounty; and the Reclamation Service has been tempted to accept this definition of the water users. Nothing could be more detrimental to the progress of a venture which demands, first of all, individual courage and independence of the people concerned. The extension act provides that the operation and maintenance of the project may be turned over to the water user. This should be done at the earliest possible date. Whether the water users organize as an irrigation district or as an incorporated water users' association is of little consequence. Any benefits that may be devised for the aid of the water

users should be contingent upon their willingness to take over the responsibility of operating and managing all but a few of the less settled projects. When this is done, a large proportion of Federal reclamation difficulties will disappear.

It is also a question whether the State in which a project is located should not be required to meet a part of the expense and become an active partner in agricultural development. The partnership of State and Nation in good roads and agricultural education has worked well. State participation in selections of projects and in their development would lessen political pressure for projects of doubtful merit and help to lessen the danger of centralized control.

The plan of repayment of construction costs of Federal irrigation projects, as established in the reclamation act and subsequent amendments, is inelastic and unscientific. After the first few years an annual repayment charge of 6 per cent of the acre cost is made for all projects, yet the acre cost and crop producing power vary greatly among projects.

Federal water users were tempted, as were other farmers, by the financial riot at the time of high prices during and immediately after the great war; and they have been caught, with farmers everywhere, by the agricultural depression of the last few years. Meanwhile, many project farmers are still struggling to convert raw, unwilling land into fertile fields, and in this laborious and expensive labor they are worthy of special help.

Numerous minor causes of project distress will be found, but, if (1) the lands of the existing projects are scientifically studied, classified and valued, (2) aid and direction given in agricultural development, (3) the project management assumed by the water users, and (4) a scientific and adequate plan of repayment adopted, all other elements of project discord and difficulty become of relatively slight importance.

In many of the projects the cost of the works built by the Government, including drainage, is more than \$100 an acre. The chief engineer of the bureau has testified before a congressional committee that he knows of no new project where water can be provided at less than \$100 an acre. Experience and investigations show that from \$100 to \$200 an acre, in addition to the project costs, must be expended by the farmer in improving and equipping the farm. Plans and policies must be formulated which will insure

(Continued on page 69)

SECRETARY EULOGIZES REPORT

CALLING attention to the fact that the conclusions of the special advisory committee he appointed on reclamation last October confirmed his conviction of a year ago that a reorganization of Federal reclamation was an imminent necessity, Secretary of the Interior Work has given out the following statement:

"The members of this committee have performed a remarkable public service for which the Government is indebted to them. Their researches have covered the entire history of reclamation in the United States. The report is a masterpiece on Federal irrigation that will serve as a textbook for future guidance.

"It supports the contention made 12 months ago that Federal reclamation was not being operated for the benefit of the farmers. It justifies every step that has been taken to effect the reorganization of the bureau for the purpose of safeguarding the water users and their families from the loss of their homes. It proves beyond doubt that, if reclamation is to succeed, agricultural development must take precedence over engineering as the primary function of the bureau.

"If the recommendations of this committee are given the sanction of Congress, I believe that Federal reclamation will be established on an enduring foundation

marking another outstanding achievement of the present administration.

"The attainment of this great service to the people of the West has not been brought about without difficulty.

"My selection of Doctor Mead, who is the greatest American authority on rural institutions, as Commissioner of Reclamation, should assure the successful future of this home-making branch of the Government."

Approximately 2,500,000 pounds of cheese are produced annually in southern Idaho, about half of which comes from the Minidoka project.

Good progress is being made in the organization of an egg-producing association and a cow-testing association on the Minidoka project.

(Continued from page 68)

competent investigations of all the conditions which affect the value of a project both to the Government and the settler. It must fix conditions as to the qualifications of settlers as to capital and experience, which will help create communities able to meet the great demands on them in the way of money for development and ability to use soil, water, and climate, as success in irrigation requires. Without these things Government irrigation in the future will provide temptations rather than opportunities.

The old pioneer settlement with its primitive farming is impossible under present conditions. Capital, technical knowledge, credit, and technical advice are all needed to make farming profitable under these costly projects. The farmers' needs must be kept in mind in re-writing this act if Federal reclamation is to succeed.

There is no feeling on the projects for repudiation of the debt to the Government. The Federal water users are true Americans. They recognize that the sum invested in the Federal irrigation enterprise is not large as congressional appropriations go, but they ask, not alms, but that the requirement made of them be proportioned to their power to win means from the soil.

The integrity of the financial operations of the service is unquestioned. The honesty, zeal, and technical skill of the engineering staff are worthy of the highest commendation. The greater attention which is now properly being given to the agricultural and economic features of Federal reclamation will require a further reorganization of the bureau. The investment of the United States in irrigation projects will not be wholly recovered. Large losses, running into millions of

SIX NEW PROJECTS ARE RECOMMENDED

SIX new reclamation projects in five Western States are recommended by the Special Advisory Committee on Reclamation in its report. They are:

Extension of the North Platte project by construction of the Guernsey Reservoir.

Extension of the Newlands project by the construction of the Spanish Springs Reservoir.

Authorization of appropriations for the Owyhee and Vale projects in Oregon; Salt Lake basin project in Utah, and Kittitas in Washington, but with the provision that further investigation should be made of their feasibility and that, if finally selected, they should be constructed and developed in accordance with the new principles set out by the committee. In commenting on these proposed new projects, the report says:

"As to these new proposed projects, the committee does not have sufficient information upon which to make specific recommendations. Attention is called to the fact that the estimated costs of construction are nearly all in excess of \$120 per acre. The committee is of the opinion that projects requiring such acre costs as above suggested should be constructed only after it is clearly shown that the lands, when irrigated, can produce annual crop values sufficient to enable the settlers to repay costs from production, and within a reasonable time."

dollars, will have to be assumed by the reclamation fund. A part of the investment will be repaid. Another part after being held in suspense for some years may be repaid. This result comes from the location of projects without recognizing the limitations of soil and climate and available markets.

The activities of the Reclamation Service have been investigated frequently. The reports and findings of these investigations are buried in the files and have apparently been given but little consideration. The time has now come when carefully considered recommendations, based upon investigations, should be given prompt and effective administrative and legislative action, if reclamation is to succeed.

There is no doubt about the successful outcome of the Federal experiment in irrigation, if the experience now gained be applied to existing and to coming projects. During the last few years these projects have produced, annually, on about 1,200,000 acres, crops valued at fifty to seventy-five millions of dollars, and as the vacant lands are brought under cultivation and the farmed lands are cultivated better, this annual income will increase. Besides, 1,101,700 acres of land are receiving a partial water supply, under the terms of the Warren Act, from the Federal irrigation projects and producing greatly increased crops therefrom. Thousands of happy families are growing up in the open country under influences that have always fashioned men and women of strength. Moreover, these projects have helped in the conquest, for human good, of the more difficult places of our country, and thereby have shown the great value of the arid and semiarid region as a part of the domain, which, in the providence of God, has been given to our country.

SUMMARY OF PRINCIPAL GENERAL RECOMMENDATIONS

Covering all phases of the Federal scheme of irrigation, the recommendations of the Committee of Special Advisers point the way to the enactment of remedial legislation

SCORES of recommendations of a general nature and applying specifically to the Federal irrigation projects are included in the "Summary of recommendations" as found in the report to the Secretary of the Interior by the Committee of Special Advisers on Reclamation. The principal general recommendations follow:

That productive power should be the basis for the annual repayments of construction costs, and for this purpose productive power of the lands should be defined to be the average gross annual acre income from the irrigated lands of a project or division thereof for the preceding 10 years, or for all years of record, if fewer than 10 years are available, and that the annual acre repayment charge should be 5 per cent of the productive power of the lands as hereinbefore defined.

That a credit fund should be provided under competent control, from which settlers on the projects can borrow money with which to make permanent improvements, or to buy needed equipment and livestock. Loans for permanent improvements, secured by the land, should run not to exceed 30 years, loans for equipment and livestock not to exceed 5 years. The rate of interest should be 5 per cent; payments of principal should be amortized; the making or refusing of loans should be at the discretion of the credit authorities.

That the Secretary of the Interior should undertake at once a comprehensive and detailed survey of the physical and economic features of the Federal reclamation projects, to secure information upon which the project lands may be classified with respect to their power, under a proper agricultural program, of supporting the farmer and his family and of repaying the construction costs of the project.

That whenever two-thirds of the irrigable area of any project shall be covered by water-right contracts between the water users and the Government, said project should be required, as a condition precedent to receiving the benefits of the relief measures herein recommended, to take over, through a legally authorized water users' association or irrigation district, the care, operation, and maintenance of all or any part of the project works, subject to such rules and regulations as the Secretary of the Interior may prescribe; and when the water users assume control of a project, the operation and maintenance charges for the year

then current should be covered into the construction account to be repaid as part of the construction repayment.

That the total net construction cost of any project should be spread equitably over the whole acreage for which the major storage or diversion works and the distribution system have been constructed. In the event the storage or diversion works or main canals are increased in capacity for the purpose of supplying lands in addition to those then supplied, the construction charges should be readjusted and equitably apportioned in accord with the area actually supplied with water. In the event the area of the lands for which storage or diversion works

That in fixing the construction cost upon lands under projects, the Secretary of the Interior should take into consideration the classes of land determined in accordance with resolution No. 13 [survey and classification of project lands], and may fix different construction costs upon different classes of land under the same project, for the purpose of so equitably apportioning the total cost that the lands may bear the burden of cost more nearly in proportion to their productive value.

That when the water users take over the management of a project, under contract with the United States, the total accumulated profits derived from the operation of project power plants, leasing of project grazing and farm lands, and the sale or use of town sites, should be credited to the construction cost of the project; and that thereafter the income from project power plants and power possibilities, grazing and farm lands, and town sites may be used as the water users direct for the benefit of the project. No dividend should be paid out of any such profits before all obligations to the Government shall have been fully paid.

That the rate of penalty (1 per cent) provided in section 3 and section 6 of the act of August 13, 1914 (36 Stat. 686), should be reduced for the future to one-half per cent.

That when it shall be definitely determined that any lands within any project are unsuitable for cultivation by irrigation, and can not by cultivation pay project costs, the amount of the project costs held in suspension against such land should be definitely charged off as a loss to the reclamation fund.

That the Bureau of Reclamation and Federal water users should unitedly work to establish on the Federal irrigation projects an economical as well as a beneficial duty of water.

That the conditions which confront settlers on reclamation projects require them to use better tools and to adopt a better agricultural program, in order to meet payments on land, improvements, and water rights. This requires the employment on the projects of trained agricultural and economic advisers who will give sound agricultural and business advice to enable settlers to increase their farm incomes and to organize for co-operation in business and social affairs. Such advisers will also be needed in carrying out the credit system recommended.

NEW RECLAMATION ERA

The Committee of Special Advisers on Reclamation makes the following recommendation concerning the NEW RECLAMATION ERA:

That the NEW RECLAMATION ERA, formerly known as the RECLAMATION RECORD, should be made essentially a periodical for the education and encouragement of the water user, and that the agricultural press in the irrigated section should be requested to give special attention to the problems of irrigation farming confronting water users on private and public irrigation projects.

or main canals have been constructed shall be decreased by excluded lands found not suitable for irrigation, then the construction charges imposed upon such excluded lands should not be charged against the remaining lands but should be held in suspense, and shall be ultimately charged off, unless by subsequent agreement all or some portion of such suspended charges may be imposed upon lands restored to irrigation or other lands for which it is found suitable to supply water.

That if, after a proper survey of construction costs and classification of soils have been made by a competent commission, it be ascertained that the present construction costs per acre are more than some or all of the classes of land within the project can bear, a fair and equitable adjustment should be made which will fix the charge per acre at a sum the land can reasonably bear.

SCIENTIFIC BASIS FOR METHOD OF REPAYMENT URGED

The Committee of Special Advisers on Reclamation points out that the present method of repayment has broken down because not founded on a scientific basis

ONE of the most important questions studied by the Committee of Special Advisers on Reclamation was that having to do with the method of repaying the project costs. Extracts from their report to the Secretary of the Interior follow:

It is worse than idle to assume that lands of equal fertility can bear widely different annual construction payments, or that lands—good, indifferent, or poor—under a single project can bear the same annual construction payments; yet the existing plan of repayment was based upon that assumption. Neither time nor an arbitrarily fixed percentage of cost is a sound basis for determining annual payments. Whether the total construction cost be great or small, it can only be paid out of the produce of the lands; hence, productivity is the only safe and fair basis for fixing annual payments.

A scientific method of repaying the construction charges of the projects should be based upon the acre income from the land. That is, a definite proportion of the annual income from each acre should be applied to the payment of the construction charges. The effect of such a method of repayment would be to make a different annual repayment charge upon each project or division of a project, in accordance with their varying productive capacities. This would have the effect of enabling a project with a low acre cost to pay out in fewer years than one of high acre cost, assuming the acre income to be the same; or, if two projects had the same acre cost, but different annual acre incomes, the one with the higher acre income would pay out first. The principle of a definite period of repayment, as contained in the reclamation acts, would be replaced by the principle of a varying period of repayment, depending upon the acre cost of water rights and the productive capacity of the land.

If such a principle be adopted as a basis for construction repayment, shall the net or gross acre income be used as a basis for collecting accrued charges? There are many arguments in favor of employing the net income; but the final argument against it is that under present conditions of agricultural practice a correct net cost of agricultural production can not be secured. Earnest attempts were made in cooperation with eminent workers in the field of agricultural economics to secure data that might be used in

determining the net acre incomes of the Federal irrigation projects. All such endeavors were unsuccessful. The construction repayments must, therefore, be based upon the average gross acre incomes, which can be determined with considerable accuracy. On projects where specialized crops, like cotton, apples, or lettuce, are grown over large acreages, and which often involve a proportionately larger cost item per acre, an adjustment may be necessary.

THE USE OF MONEY WITHOUT INTEREST

AT 4 per cent the interest on the moneys advanced by the Government under the repayment period of 20 years would amount to more than one-third of the capital invested. The acre charge is, therefore, really only two-thirds of what it appears to be. Considering the active reclamation projects as a whole, had the equivalent in simple interest at 4 per cent been charged on all moneys due from the water users, under the law, during the history of the service, it would have amounted to \$57,151,835 on the net investment of \$135,650,498.63. It is altogether too common to consider the acre costs on the Federal reclamation projects without reference to the advantage resulting from use of Federal money without an interest charge, when in fact the water user is requested to pay annually an amount equal to 5 per cent of the acre cost, and then at the end of the 20-year period is forgiven the capital charge.—Report of Committee of Special Advisers on Reclamation.

Crop yields on the same soil vary considerably from year to year. Market conditions show a similar variation. If annual repayment charges were based upon the acre income of each preceding year, there would be a marked variation in the annual construction repayments. Such fluctuations should be so small that the farmer may be able to foretell, within narrow limits, the charge that he will have to meet from year to year. This can be accomplished by using the average acre income of the preceding 10 years as a basis for calculating the repayment charge for any year. With each successive year, the first year of the last average would be dropped off and the new year

added. In such manner, each succeeding year, with its high or low acre income, would affect the basic average but not sufficiently at any one time to cause a wide departure from preceding payments. Any one of the 10 years would affect the repayment charge only one-tenth, but its influence would be felt.

Reliable crop statistics have been gathered by the Reclamation Service from the Federal irrigation projects since 1912. Should the plan of repayment here proposed be adopted, an even more complete crop survey should be made from season to season. Such statistics, while furnishing a basis for the annual construction charge, would serve other purposes in directing agricultural development upon the projects.

The data already available are sufficient to permit the compilation of 10 year averages of crop yields on most of the projects.

The percentage to be applied to the average acre yield to determine the actual annual charge for repayment must of necessity be somewhat arbitrarily established; yet it must come within the ability of the farmer to live and to meet his various obligations. Unless this is done, the plan fails of its purpose.

In 1923, during a period of severe agricultural depression, when the charge of 6 per cent of the construction cost had been reached, five projects paid on construction more than 5 per cent of the average acre-crop income; five, between 4 and 5 per cent; four, between 2 and 3 per cent; five, between 1 and 2 per cent; and one, under 1 per cent. On every project, excepting Yakima (Sunnyside division), Okanogan, and Minidoka (Gravity division), an annual charge for construction of 5 per cent of the average acre-crop returns for the last 10 years would be smaller than the charge of 6 per cent of the construction cost, which is now the legal requirement. The water users in their Salt Lake City resolutions of January, 1924, suggested an annual construction charge not to exceed 5 per cent of the average acre income for 10 years, as a charge that can be paid by the water users. This opinion agrees with our findings from our study of the situation on the Federal reclamation projects.

A corollary of this plan of repayment is that the lands on the projects be classified carefully, according to their probable acre income, and that each class on each project be treated as a unit in fixing the annual repayment charge.

AGRICULTURAL AND ECONOMIC NEEDS OF THE SETTLER

Committee of Special Advisers on Reclamation points out that other countries have found it necessary to include planned settlement, credit for development, and expert agricultural and businesslike advice to settlers

IN the report to the Secretary of the Interior by the Committee of Special Advisers on Reclamation it is pointed out that the important features of the original reclamation act were estimates of cost of main canals and reservoirs and the area of land they would irrigate; whereas all the complex questions of how land was to be made ready for irrigation, what it would cost to improve and equip a farm, what crops could be grown, and where they could be sold, were left to be worked out by individual settlers, without information, plan, or direction by anyone. Brief extracts from this comprehensive chapter in the report follow:

Twenty-five years ago the farmer could dig in and in some way succeed with little or no capital, because water rights cost from \$5 to \$15 an acre and land was free. He can not do it when water rights cost from \$50 to \$150 an acre, and settlers have to pay high prices for raw land.

The situation created by the inclusion of privately owned land in Government projects deserves more attention than it has received. If the reclamation act is to continue to be used to reclaim private land, then the Government should either acquire all land so owned in excess of a homestead, or fix the price at which the owner must sell before work begins.

When the reclamation act was passed, everything connected with western agriculture and irrigation development was primitive and cheap. The amount of money a settler needed was only a small fraction of what is now required. Now farms must be equipped for intensive cultivation. The primitive tools and poor stock which answered when everything was cheap will not provide sufficient money to meet increased expenses. The family must be able to live under better conditions; the farmer must have more science and skill, and the farm must be provided with the following: A house, buildings to shelter livestock and implements; one or more cows and a team of horses; furniture for the house and implements for the farm; the land must be leveled for irrigation; small lateral ditches to distribute water; boundary and subdivision fences; money for living expenses until a crop can be grown.

Experience has shown that in the majority of cases the settler can not succeed without the establishment of some credit scheme which will enable him to borrow the necessary money, on long time payments, at a lower rate of interest than local banks can afford to give. As yet

no such credit scheme has been provided by the Government. Such loans are provided in other countries through their rural credit banks as a part of the colonization and reclamation policies.

CROP MARKETING A VITAL PROBLEM

FARM crops are either consumed by the farm household or sold. The type of agriculture determines the relative proportion consumed or sold. Under a system of diversified farming, more of the products are consumed than under a single crop system. Some of the farmer's crops must, of necessity, be marketed. Since a large proportion of the farmer's products must be sold, marketing becomes of the highest importance. The nature of the available markets, their distances from the farm, transportation rates, and all the complex factors that connect the producer and the consumer determine in a large measure the profitability of farming.—Report of Committee of Special Advisers on Reclamation.

The delays, anxieties, and waste of time and effort of settlers under irrigation projects in the United States who have spent all their own money before their farms have been made going concerns, and who have been unable to go on because money to complete development could not be borrowed, make it important that credit as a means of relief to present settlers, and as one of the agencies for insuring happier results in the future, be made a part of the national reclamation policy.

Aside from the irrigation works and the unformed dirt roads, everything required to transform the desert into productive farms remains to be done. The land must be cleared. The farm unit must be fenced. A house for the family and a stable for the work animals have to be built, and provision has to be made for a water supply for household use. Not being familiar with local conditions, settlers are not able to buy to advantage, as they are under pressure to buy quickly. Many are victimized with bad horses and poor cows.

Settlers are often unable to procure cows or horses locally. Many have to be shipped long distances, and whoever renders that service, usually, though not always, charges a heavy commission.

There is always danger that the newcomer looking for cows will be sold the culls from dairy herds and starts under a heavy handicap.

Until a house can be built, the settler's family has either to live in a tent or board in town. Illness often results, while costly living expenses and delay in beginning productive employment contribute to make all concerned homesick and discouraged.

The land has to be prepared for irrigation before a crop can be grown. To do this so that water will flow evenly over the surface requires knack and experience. Lacking these, money and time are wasted and the final result is often so unsatisfactory that the work has to be done over again. Few settlers can afford to buy special equipment for leveling land cheaply; hence the actual cost is increased and completion delayed. To leave this costly preparatory work to be done by the settler who lacks team strength, implements, and practical skill, involves a ruinous waste of money and time. Nothing could be more inefficient. Careful consideration should be given to whether the leveling of land and making it ready for the application of water is not as essential a part of reclamation as building the canals and reservoirs.

If money for development is provided, its expenditure must be watched. Inexperienced beginners must not be allowed to waste it. The modern conception of reclamation includes experts in agricultural practices and the business of agriculture, as well as expert engineers. People drawn from widely separated parts of the country must be brought to know each other and work together, in order that they may cooperate in doing things which the community can do better than the individual. These include the purchase of livestock, material for houses, the working out of an agricultural program that will lead to the planting of crops suited to the soil and climate, teamwork in buying, and arranging for marketing of their products in such manner that the man on 40 acres inside the project can do business on equal terms with the man with 1,000 acres outside. These are not fanciful theories; they are a part of modern methods and modern progress in building up prosperous and successful communities under irrigation in other countries. The reclaimed areas of the arid West afford one of the finest opportunities for their introduction into this country.

WATER USERS' ORGANIZATIONS SHOULD BE AWAKENED

Committee of Special Advisers on Reclamation believes that such project organizations should take upon themselves a full share of responsibility for the work of reclamation

WATER USERS' organizations occupy a prominent place in the report of the Special Advisers on Reclamation to the Secretary of the Interior. In this connection the committee comments, in part, as follows:

On all but one project, water users' organizations are incorporated under the laws of the several States in which Federal irrigation projects are located. Stock is issued to the stockholders, usually on the basis of the acreage to be brought under water. The organizations are maintained as legal entities with which the Government may do business. The powers of such water users' organizations have not been fully defined because of the failure of these associations to function in behalf of the projects. However, it is generally believed that these organizations as they stand may legally make contracts with the Bureau of Reclamation, take over the management of the projects as indicated in the fundamental reclamation laws, make collections from individual stockholders, make payments to the Government, impose penalties upon such members as are delinquent, and in every way carry on the work intended under the reclamation law.

One such water users' organization, namely, that of the Orland project, without having assumed management of the project, is taking the full responsibility of making collections and, in behalf of the farmers, dealing with the Reclamation Service. Another such organization, that of the Salt River project, has entered into a contract with the Government by which it is in full control of the project, operating and maintaining it and dealing, in behalf of the farmers, with the Reclamation Service.

A fundamental principle of success in the handling of reclamation projects is to place the management of the project in the hands of the water users just as soon as the project is in a suitable condition for such transfer. All the disadvantages of paternalism are either removed or modified when the water users control the irrigation project; and the dangers of bureaucracy are likewise greatly lessened. The placing of the responsibility for the upkeep and the general maintenance of the project encourages individual and united effort, which is invariably beneficial. Not a few of the ills which have beset the Federal irrigation projects may be traced

to the feeling that they are essentially governmental ventures, for which the farmer has little or no responsibility, and that, in any event, the Government will protect the farmer from serious consequences, even of his own neglect. The management of all projects should be turned over to water users' associations just as soon as two-thirds of the units under the project, or divisions of a project, have been covered by water contracts with the Federal Government.

PROPER USE OF WATER A FACTOR OF SUCCESS

THE wise and economical use of water must be the main concern of all interested in the development of the projects, as well as in the development of the arid and semiarid area of the country. In fact, it is not the quantity of water secured by irrigation structures that determines the area of irrigated land, but rather the manner in which the available water is used. The extent of reclamation, the character of agriculture under the ditch, and the permanence of a civilization built upon irrigation, depend upon the use of irrigation water; that is, upon irrigation practice.—Report of Committee of Special Advisers on Reclamation.

In general, it is inadvisable to retain any part of an irrigation project for immediate Federal control, as against water users' control. The system below the major works and the water flowing into it should be completely and wholly under the management of the water users' organization, acting under the contract with the Federal Government; and, if the contract so provides, the major works may be cared for by the water users.

In connection with some of the Federal projects, electric power plants have been constructed; and grazing and farm lands and town-site lands were bought by the Government, charged to the construction account of the project, and are to be paid for by the water users. The income from such power plants, grazing and farm lands, and town-site lands should be credited to the water users' organization, and should by them be disposed of as they see fit in helping to satisfy the annual charges against the project.

An irrigation district differs essentially from a water users' association in that all the lands belonging to the district are jointly liable for the project debts and that the district may make its collections in the same manner as taxes are collected. It is generally held that in a water users' association, properly organized under the laws of the respective States, resides the power to do any or all acts that would lead to the carrying out of the terms of the contract of the association with the Federal Government. The farmer usually hesitates to agree to the forming of an irrigation district, because of his fear that since the district assumes the district obligations, he, personally, may become liable for payments overdue from his neighbors. In certain other cases old water rights furnish a complicated problem for district solution, and the water users' association in such cases seems the simpler form of organization. There is not much real difference between the two organizations as they would work out the problems of the Federal irrigation projects.

It is difficult, after these many years, to understand why the water users' organizations of the respective Federal irrigation projects were not made to function from the very beginning, and to take upon themselves their share of responsibility for the work of reclamation. One of the requests of the water users in the hearings before Secretary Lane was that the management of the projects be turned over to the water users of the respective projects upon their request. Only one such request has been made. Unquestionably, on most of the projects there would have been a very different feeling toward the whole Federal reclamation program had the water users themselves been responsible from year to year for the management of the projects.

The projects should not continue, as at present, under the direct management of the Bureau of Reclamation when properly formed water users' associations exist that are languishing because real responsibility has not been assumed by them. The water users' associations should be awakened, and should be required, where conditions are proper, under satisfactory contracts, to take over the management of the projects, and to carry the full responsibility for operation and maintenance.

COMMITTEE RECOMMENDS THAT LOSSES BE CHARGED OFF

The Committee of Special Advisers on Reclamation lists definite losses at \$18,561,146 and probable losses at \$8,830,000 in their comprehensive report to the Secretary of the Interior

ONE of the sections of the report of the Committee of Special Advisers on Reclamation to the Secretary of the Interior has to do with the question of losses to the reclamation fund. This is discussed under the heading "Summary of losses," which follows:

It has been found not just to require, and in some instances not possible to obtain, the total repayment of costs of investigation, construction, operation, and maintenance charged against the projects.

Hence the reclamation fund must suffer depletion to the extent that such costs should not or can not be repaid either by the water users or by the United States. There are two classes of projects—secondary and primary.

Costs charged against secondary projects cover all expenditures for preliminary reconnaissance, surveys, and examinations. If a secondary project is selected and construction authorized, such preliminary expenditures become part of total construction; if a secondary project is not selected and authorized, such preliminary costs are carried in suspense account. If a secondary project is definitely abandoned, the reclamation fund must suffer a permanent depletion in the amount of such preliminary expenditure.

Total costs charged against primary projects cover preliminary expenditures, all expenditures for construction, operation and maintenance during construction, before public notice, and accumulated unpaid expenditures for construction, operation and maintenance, interest and penalties which have been added to the total costs by authority of law.

The committee has found that such total costs on some projects are in excess of what water users can or should be required to repay. The reclamation fund must suffer depletion to the extent that water users can not repay and should suffer depletion to the extent water users should not repay such costs. The reports upon special projects contain the facts regarding costs and the reasons for recommending reductions or charges to water users. The accompanying table shows the actual and probable reductions which the committee recommends.

Under the head "definite loss" items are listed which must result in actual depletion of the fund.

Under the head "probable loss" items are listed which are estimated, the amounts depending upon the acreages now not capable of profitable cultivation,

RECLAMATION FUND LOSSES

Project	Probable loss	Definite loss
Salt River		\$382, 097
Yuma auxiliary	None.	None.
Yuma	\$2, 700, 000	1, 361, 000
Orland	None.	None.
Grand Valley	1, 000, 000	
Uncompahgre	1, 500, 000	47, 370
King Hill		1, 000, 000
Minidoka	None.	None.
Boise	None.	None.
Garden City		334, 475
Huntley	400, 000	100, 000
Milk River		3, 000, 000
Sun River:		
Fort Shaw division	130, 000	70, 000
Greenfields division		1, 850, 000
Lower Yellowstone		1, 000, 000
North Platte	600, 000	None.
Newlands		3, 500, 000
Carlsbad	None.	None.
Hondo		371, 886
Buford-Trenton		294, 318
Williston		600, 000
Rio Grande	None.	None.
Umatilla		600, 000
Klamath	500, 000	250, 000
Belle Fourche	750, 000	None.
Strawberry Valley	None.	None.
Okanogan	500, 000	275, 000
Yakima	None.	None.
Shoshone, Frannie division	750, 000	2, 325, 000
Riverton ¹		
Secondary	None.	1, 200, 000
Total	8, 830, 000	18, 561, 146

¹ Under construction.

LIVESTOCK NEEDED ON PROJECT FARMS

THE type of agriculture on the Federal irrigation projects is not yet of an intensive character. It represents fairly good diversification; but, when taken in connection with the number of farm animals on a 40-acre farm, especially of dairy cows, it becomes deficient in livestock, so that a large proportion of the field crops must be sold off the farm. Such a type of agriculture may be satisfactory on a soil of high productive power, but where the acre yield is relatively small, it is of the utmost importance that the farmer convert the products of his soil into the most profitable animal products, so that he may retain for himself as much as possible of the profit residing in the operation of his farm.—Report of Committee of Special Advisers on Reclamation.

but which may hereafter be restored to or found capable of profitable cultivation. Under this head are also listed items which may be restored to the fund by congressional action.

A few new settlers have come from Canada and rented land on the Greenfields division of the Sun River project. They were formerly entrymen on the Shoshone project who sold out there and went to Canada, but did not find conditions to their liking.

The Commissioners of the Fort Shaw Irrigation District on the Sun River project have voted to proceed with the organization of a marketing association.

More than 600 new families were reported on the Rio Grande project, and the increase in the area farmed will exceed 12,000 acres.

SPECIFIC RECOMMENDATIONS ON INDIVIDUAL PROJECTS

Special Advisory Committee favors maintenance of levee system on Yuma project by the Government—Salt River, Orland, Grand Valley, Uncompahgre, King Hill, and others included

SPECIFIC recommendations to be applied to individual reclamation projects were included in the report of the Special Advisory Committee in addition to the general recommendations. A summary of these recommendations for the projects by States follows:

• ARIZONA

Salt River project.—That this project be granted the right to amend the existing contract in accordance with any future legislation enacted affecting the terms and periods of repayment of construction costs.

ARIZONA-CALIFORNIA

Yuma project.—That moneys received under contract entered between the United States and the Imperial Irrigation District in 1918 be credited to the Arizona-California Yuma project, including the Mesa division, upon an equitable basis.

That the \$580,936 expended on the Arizona main canal, which was subsequently abandoned, be deducted from the general reclamation fund as money lost beyond recovery.

That the reclamation fund be reimbursed by an appropriation equal to the expenditures made on the Yuma project for levees constructed as protective works from floods in the same manner as other improvements under the rivers and harbors act are paid by the General Government.

That the expenses incurred in the maintenance of the levee system amounting to about \$100,000 a year be divided between the States of California and Arizona and the War Department in a similar manner as levees are maintained on the Mississippi River and not charged in the future against the operation and maintenance expenses of this project.

Yuma auxiliary.—That this division was constructed under the provisions of an act of Congress approved January 25, 1917, known as "An act to provide for an auxiliary reclamation project in connection with the Yuma project in Arizona." That the drastic provisions of this act are impossible of fulfillment and only a few of the settlers have been able to meet their contracts. That they will soon fail as the charge for water will bankrupt them. That an early study be made by the Bureau of Reclamation of this division, with a view of making recommendations to Congress for financial relief, or the disposal of the division, if adequate relief is not feasible.

CALIFORNIA

Orland project.—That a suitable contract be drawn giving the water users the full management of this project, and that upon their assuming control the operation and maintenance charge for the year then current be covered into the construction account to be repaid as part of the construction payments.

COLORADO

Grand Valley project.—That because of the exclusion of large bodies of land originally embraced within this project by reason of their lack of fertility as to make them unfit for agricultural cultivation; and because a considerable portion of the lands now included within this project is of such a character as to require several years cultivation before profitable returns can be had; and because, by reason of this situation, the acre charge against the settler has been practically doubled over the original estimates although the project was built within the estimated cost, a complete review of the situation should be made upon which shall be based an equitable adjustment of the project cost to settlers. This review should take into consideration topography, location, and difference in soil upon each farm unit, which factors are necessarily controlling as to the crop value of the lands, and furnish the true measure of the charge that each farm unit within the project is able to bear.

That pending such review and readjustment "public notice" be not given and that only such rental charges for water be made as the land in cultivation can reasonably bear.

Uncompahgre project.—That the project costs be spread over the entire irrigable area of 129,942 acres, classified with 97,410 acres in class 1 and 32,532 acres in class 2 by the public notice, dated April 12, 1912, instead of the charge being levied against only 97,410 acres as at present, for the reasons that a part of the cost of this project was incurred in the construction of the irrigation works to reach the 32,532 acres in class 2, that the entire system was designed to irrigate an area included in both classes, and that to restrict these charges to the smaller area in class 1 imposes a greater burden than is just on the lands in class 1 and unfairly relieves the lands in class 2 of any burden.

That a reclassification of the lands within this project be made and the

charge per acre fixed according to the productivity of the land, and that no lands be charged with more than \$70 per acre as fixed by the public notice.

That the construction and operation and maintenance charges on lands found by this classification to be unsuited to immediate cultivation and unable to pay project costs be suspended until such time as the owners apply for water under the charges fixed by the classification, and that until such application is made no water be supplied to these lands. That the claim of the Uncompahgre Water Users' Association that the charge against them should be established at \$25 per acre is unjustified by the record.

IDAHO

King Hill project.—That the Bureau of Reclamation shall retain the management of the project until conditions are improved and that the bureau make a careful study of conditions prevailing on the project with reference to the repayment of construction costs. That the settlement of the lands on the project be encouraged and especially the breaking up of the larger holdings into smaller units for the benefit of home makers. That the present appropriations be held in suspense until definite plans have been determined upon following the investigation.

Minidoka project.—That additional pumping facilities shall be added as may be necessary from time to time. That the district should assume the management of the project and be credited one year's operation and maintenance to be covered in the construction costs and that the new repayment plan fixing annual per acre charge in accordance with productivity of the land should be put in force on this project, the existing delinquencies to be covered into the new construction account. That there should be a definite settlement of the problems of power, excess water, townsites, and grazing and farm lands, the receipts to be credited to the project. That drainage should be added as necessary, but it ought to be mandatory for the small acreage.

IDAHO-OREGON

Boise project.—That a survey be made of the lands of the project for the purpose of determining equitable acre charges. That the water users take over the management of the project, and that upon

(Continued on page 76)

NEW RESERVOIR RECOMMENDED FOR NEWLANDS PROJECT

Special Advisory Committee in report solves difficulties of water users on many projects by specific recommendations that take up important problems needing action

(Continued from page 75)

their assuming control the operation and maintenance charge for the year then current be covered into the construction account to be repaid as part of the construction payments. That drainage costs be included in the supplementary construction costs.

MONTANA

Huntley project.—That the water users should take over the management of this project and that there should be no reduction in the acre costs. That the amount charged to operation and maintenance in early years of this project, which was, according to the statements of the water users, over and beyond the amount for which they had obtained receipt in full, should be charged to the reclamation fund as a loss, providing the statements of the water users are found to be correct. That a contract should be entered with the water users along the general lines now being negotiated but subject to the recommendations of the report of the committee. That drainage as necessary should be undertaken under the supervision of the Bureau of Reclamation.

Milk River project.—That the lands be classified and the per acre annual construction costs fixed in accordance with the productivity of the soil. That unless the water users, who have been unwilling to regularly take and pay for water, agree to enter into enforceable contracts for regular supply, it would be better for the Government to abandon this project. That the proposed contract with the settlers should not be made unless the private land owners of the project shall agree to an absolute sale of excess holdings at acre prices, the maximum to be approved by the Government, and that these private land owners shall also agree to pay operation and maintenance charges pending disposition of excess lands.

Sun River project.—That the district should take over the management of the Fort Shaw division and be credited one year's operation and maintenance costs to be covered into the construction costs. That excess operation and maintenance charges, prior to 1918, should be taken over by the Government and charged off as a loss to the reclamation fund. That the necessary drainage should be constructed by the bureau.

That public notice should be delayed on the Greenfields division of this project until it is ready for profitable operation.

That the canal should be repaired and complete drainage constructed.

MONTANA-NORTH DAKOTA

Lower Yellowstone project.—That the charge of \$60 per acre for water on this project is excessive because the low productive value of the land is not sufficient to pay it and because there were some unwarranted costs incurred on the construction of the project.

That the charge against the lands on the project be revised and fixed at not more than \$45 in any instance, as of June 30, 1923, and that the charge on each farm unit should be in accordance with the productivity of the land.

That whatever legislation is necessary to permit the making of this adjustment should be enacted.

NEBRASKA-WYOMING

North Platte project.—That the Guernsey Reservoir be constructed and operated.

That the project be immediately turned over to the water users' association under the general recommendations outlined by the committee and that the tentative pending contract be made the basis of such transfer.

NEVADA

Newlands project.—That the Spanish Springs Reservoir be immediately constructed; otherwise the interests of both the settlers and the Government will be seriously jeopardized. That the items included in present construction charges which are found to be nonbeneficial to the project be charged off as a loss to the Government and that proper credits be given equitable to the whole project. That further examination be made of the 20,000 acres of private lands with prior water rights, for the purpose, if feasible, of either acquiring the lands or obtaining an agreement for their subdivision and sale at a fixed price and bringing them definitely under the project as is the case with other lands. That whatever legislation is necessary to permit the making of these adjustments should be enacted.

NEW MEXICO

Carlsbad project.—That a serious situation confronts this project created by the rapidly silting up and leakage from the main storage reservoir and the ultimate failure of the project is certain unless additional storage be provided at an early date.

That an expert engineering survey be made to secure additional feasible storage, and that the lands on the project be reclassified with the necessary changes in the repayment of construction costs in accordance with the productivity of the lands.

Hondo project.—That this project, having proved a failure and its operation having been discontinued, be appraised and sold and the losses incurred charged to the reclamation fund.

NEW MEXICO-TEXAS

Rio Grande project.—That no further appropriations by the United States be made to cover the expenditures to fulfill treaty obligations with Mexico, for the reason that the original appropriation of \$1,000,000 has been found to be ample.

That the lands taken for drainage ditches on this project shall not be classed in the irrigable area and no water-right charges shall be made against them.

That the operation and maintenance of the storage works and the division dam should continue to remain under the control and management of the bureau, which will also complete the drainage system.

That each irrigation district shall take over the operation and maintenance of the distributing system within their respective districts.

That the Bureau of Reclamation shall continue its investigation for a damsite with a view of future power development.

NORTH DAKOTA

Williston project.—That the history and prospects of this project do not justify its further operation and that it be appraised and sold and the losses incurred charged to the reclamation fund.

That the Buford-Trenton division of the project, having proved a failure and its operation having been discontinued, be appraised and sold and the losses charged to the reclamation fund.

OREGON

Umatilla project.—That the construction costs of each division be spread equally over the entire area for which works have been constructed, and that the lands be classified with a per annual acreage charge in accordance with their productivity. That the type of agriculture suitable for this project be devised and put into operation. That the water

users through their irrigation districts take over the full control of the operation and maintenance of this project.

OREGON-CALIFORNIA

Klamath project.—That the claim of the settlers of the Tule Lake division of this project that there should be a reduction in the charge of \$90 per acre as established by public notice of September 29, 1922, and subsequently withdrawn, is well founded and that a survey be made and a board of review be appointed to consider the reduction of the present acre cost by adjusting the main items set up by the water users. That the drainage estimates be not included in the acreage charge of this project, but, as needed, appear as supplementary construction. That all project costs incurred for lower Klamath Lake lands or other lands, later eliminated, shall be deducted from the construction costs on all project lands, which have been fixed or may be fixed since such eliminations occurred, and that such deducted amounts shall be held in the suspense account.

SOUTH DAKOTA

Belle Fourche project.—That the combined expenses of providing water on this project, which included construction cost, operation and maintenance, and payments on project construction costs of necessary drainage, have been greater than the value of water in irrigation, which has resulted in accumulated arrears. That these problems have been adjusted under a contract entered into between the district and the Government.

That it is believed, under the plan of repayment recommended by the committee, settlers can meet their payments, but there will be a large deficit until the occupied lands are settled and brought under cultivation.

That a survey for the classification and equitable valuation of the lands be made, and that they be grouped in accordance with their productivity.

That there be a disposition of all adjusted unpaid charges by transfer to the total construction costs, and that the general plan of repayment proposed by this committee be adopted for this project.

UTAH

Strawberry Valley project.—That the management and operation of this project should be taken over at once by the water users under a contract similar to the one existing between the Salt River project and the United States, and that at the time of making the transfer of the management and operation, the accrued and future receipts from grazing lands and power plants should be disposed of

RECOMMENDATIONS FOR NEW PROJECTS

In the construction of new projects or additions to existing projects the Special Advisory Committee in its report makes many recommendations. Some of the more important ones follow:

That no reclamation project shall be hereafter authorized until all privately-owned land in excess of a single homestead unit for each owner shall have been purchased by the United States or by contract placed under the control of the Reclamation Bureau for subdivision and sale to settlers at an approved price.

That in the settling and disposition of farms upon projects, the Government should examine into the qualifications of the prospective settlers who must have industry, experience, character, and capital. Only those who have reasonable prospects of succeeding should be permitted to settle on projects.

That the expense of leveling project lands and building suitable distribution systems for efficient and economical irrigation shall be made a part of the construction costs to be assessed on new projects as are other construction costs.

That no new projects or extension of existing projects shall be authorized until full information has been secured concerning water supply, engineering features, soil, climate, transportation, markets, land prices, probable acre cost of development, and other factors upon which the success of a project must depend. That all such information shall be secured through designated representatives of the Departments of the Interior, Agriculture, and Commerce, who shall, after careful investigation, make to the Secretary of the Interior a report upon the feasibility of the project or the extension of an existing project, having in mind primarily the creation of opportunities for actual settlement and farm homes and the repaying of the total investment made by the Government.

by crediting them to the construction costs of the project. That the repayment requirements of this project should be proportioned to the productive capacity of the project lands under the proposed repayment plan.

WASHINGTON

Okanogan project.—That the cost of the Salmon Lake and Conconully Reservoirs be deducted from the construction costs of the water users and charged off as a loss to the reclamation fund, and that water from these reservoirs hereafter be sold to the water users on a rental basis. That the project costs, as of January 10,

1919, be spread equally over the entire area for which works had then been constructed, and that a competent survey be conducted after which the lands susceptible of profitable cultivation shall be entirely relieved of the payment of any part of the project costs allocated to lands determined to be unsuited for profitable cultivation, including those heretofore excluded. That the cost of the power plants built in canals to furnish power for pumping be charged to the project only if it is shown that power can be furnished as originally planned. That study be made for possible sources of irrigation water for lands of this project.

Yakima project.—That the operation and maintenance of this project be taken over at once by the water users. That the proposed plan of repayment apply to such divisions of the Yakima project as may elect to accept them.

WYOMING

Riverton project.—That this project was authorized in 1917 with an estimated cost of \$8,000,000, of which about \$1,000,000 has been expended.

That in the future development of the project the Bureau of Reclamation apply the principles set out in the report covering the construction of new projects.

Shoshone project.—That the Frannie division should be abandoned in whole or in part under such conditions as will be just to the settlers. That the Bureau of Reclamation immediately make a survey of the Frannie division and make detailed recommendations providing for such whole or partial abandonment. That pending the putting into effect of this recommendation, the construction costs allocated to the division and all charges for construction and operation and maintenance against the settlers be held in suspense, without interest or penalty, and that water be supplied settlers now actually irrigating their lands at a rental to be agreed upon and that no additional lands be irrigated.

That the control and management of the Garland division be taken over by the water users, and that the lands be reclassified and repayment of construction charges be charged in accordance with their productivity.

That the operation and maintenance charges of this division be segregated in such a manner that this division shall be liable only for its own operation and maintenance costs.

That power profits shall be credited to the power construction account until the final adjustment of costs is made upon the several divisions.

That the income from grazing lands and townsites shall be credited to the project.

BILLS INTRODUCED IN CONGRESS TO HELP RECLAMATION

Following recommendations of the Special Advisory Committee measures are presented to Congress providing for equitable adjustment of existing accounts and change in method of repayments

AS a result of the report of the special advisory committee, two bills have been introduced into Congress embodying all the recommendations made by the committee for safeguarding future Federal irrigation development, equitably adjusting existing accounts on projects, embodying the proposed repayment plan and other changes in the present law. One of the bills deals entirely with a revision of the present reclamation law while the other authorizes appropriations for the investigation and construction of new projects and additions to existing projects. The first bill follows:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That when used in this act—

"(a) The word 'Secretary' means the Secretary of the Interior.

"(b) The words 'reclamation law' mean the act of June 17, 1902 (Thirty-second Statutes, page 388), and all acts amendatory thereof or supplementary thereto.

"(c) The words 'reclamation fund' mean the fund provided by the reclamation law.

"(d) The word 'project' means a Federal irrigation project authorized by the reclamation law.

"(e) The words 'division of a project' mean a substantial irrigable area of a project designated as a division by order of the Secretary.

"Sec. 2. That hereafter no new project or new division of a project shall be approved for construction until information in detail shall have been secured concerning its feasibility, its adaptability for actual settlement and farm homes, and the probable return of the cost thereof to the United States. To this end, it is directed that before approval by the Secretary of any such project or division, he shall secure a report in detail concerning the water supply, engineering features, cost of construction, land prices, and probable acre cost of development. The secretary shall also secure through the Secretary of Agriculture a report in detail relative to the climate, soil, kind of crops for which the proposed development is adapted, and probable production; also, through the Secretary of Commerce, a report in detail with respect to transportation facilities, markets, and other economic factors upon or affecting the proposed project or division.

"Sec. 3. That hereafter no moneys shall be expended for construction on account of any new project or any new

*division of a project until an appropriate repayment contract, in form approved by the Secretary, shall have been properly executed by a district or districts organized under State law, embracing the lands irrigable thereunder, and the execution thereof shall have been confirmed by decree of a court of competent jurisdiction, which contract, among other things, shall contain an appraisal approved by the Secretary, showing the actual bona fide value of all such irrigable lands fixed without reference to the proposed Government development, and shall provide that until the Government construction charges against such lands shall have been fully paid, upon any and every sale of the land or any interest therein, 50 per centum of all moneys, credits, and property received therefor above the value thereof as shown by said appraisal, shall belong to the United States to be credited in reduction of the construction charge against the lands so sold, and the Secretary may convert into money any such credits or property so belonging to the United States; and all public lands irrigable under any such project or division shall be entered subject to the conditions of this proviso which shall be applied thereto: *Provided further, That hereafter no moneys shall be expended for construction on account of any such project or division until all areas of land irrigable thereunder and owned by any individual in excess of one hundred and sixty irrigable acres shall have been conveyed in fee to the United States free of encumbrance to again become a part of the public domain, under a contract between the United States and the individual owner providing that the value as shown by said appraisal of the land so conveyed to the United States shall be credited in reduction of the construction charge thereafter to be assessed against the land retained by such owner; and lands so conveyed to the United States shall be subject to disposition under the reclamation law when so ordered by the Secretary: And provided further, That hereafter no moneys shall be expended for construction on account of any such project or division until an appropriate contract in form approved by the Secretary shall have been properly executed by all holders of Federal land grants of more than one hundred and sixty acres irrigable thereunder, which shall provide for the sale of such lands to actual bona fide settlers at not more than the value thereof as shown by appraisal: And provided further, That the provisions of this section shall not apply to Indian lands or to**

lands to be served with water under the Warren Act of February 21, 1911 (Thirty-sixth Statutes, page 925).

"Sec. 4. That the Secretary is hereby authorized, under regulations to be promulgated by him, to require of each applicant for entry to public lands on a project such qualifications as to industry, experience, character, and capital as in his opinion are necessary to give reasonable assurance of success by the prospective settler. Any person not having the qualifications so prescribed by the Secretary shall not be entitled to make such an entry or an application therefor.

"Sec. 5. That hereafter the irrigable lands of each new project and new division of a project shall be classified by the Secretary with respect to their power, under a proper agricultural program, to support a family and pay water charges, and the Secretary is authorized to fix different construction charges against different classes of land under the same project for the purpose of equitably apportioning the total construction cost so that all lands may as far as practicable bear the burden of such cost according to their productive value. Reclassification surveys may be made by the Secretary periodically, as experience may suggest, for the purpose of determining any changes that may accompany a continued cultivation and irrigation of the lands.

"Sec. 6. That hereafter the Secretary shall as to each irrigable acre of land in a project, issue two public notices relating to construction charges. The first public notice shall be issued when the land is ready for settlement and will announce the construction charge per irrigable acre. The second public notice shall be issued when in the opinion of the Secretary the agricultural development of the project shall have advanced sufficiently to warrant the commencement of payment of installments of such construction charge. The second public notice shall fix the date when payments will begin on the construction charge announced by the first public notice, which date shall be not less than five years from the date of the first public notice.

"Sec. 7. That hereafter all project construction charges shall be made payable in annual installments based on the productive power of the land as provided in this section. The installment of the construction charge per irrigable acre payable each year shall be 5 per centum of the average gross annual acre income for the ten calendar years first preceding, or for all years of record if fewer than ten

years are available, of the area in cultivation in the division of the project in which the land is located, as found by the Secretary annually. The decision of the Secretary as to the amount of any such installment shall be conclusive. These annual payments shall continue until the total construction charge is fully paid. The Secretary is authorized upon request to amend any existing contract for a project water right so that it will provide for payment of the construction charge thereunder in accordance with the provisions of this section.

"SEC. 8. That the penalty of 1 per centum per month against delinquent accounts, provided in section 3 and section 6 of the act of August 13, 1914 (Thirty-eighth Statutes, page 686), is hereby reduced to one-half of 1 per centum per month, as to all installments hereafter coming due. The Secretary is authorized to amend all existing contracts accordingly.

"SEC. 9. That whenever the water users take over the care, operation, and maintenance of a project the total accumulated net profits derived from the operation of project power plants, leasing of project grazing and farm lands, and the sale or use of town sites shall be credited to the construction cost of the project, and thereafter the net profits from such sources may be used by the water users to be credited, first, on account of project construction cost, second, on account of project operation and maintenance cost, and, third, as the water users may direct. No distribution to individual water users shall be made out of any such profits before all obligations to the Government shall have been fully paid.

"SEC. 10. That all profits which may be derived from the sale or rental of surplus water under the Warren Act of February 21, 1911 (Thirty-sixth Statutes, page 925), shall be credited to the project or division of the project to which the construction cost has been charged. Contractors for the use of water under said Warren Act shall participate in the assets of the project with the contractors for the use of water within the project in proportion to the amounts paid for the water right. The Secretary is authorized upon request to amend any existing contract made under said Warren Act so that it will provide for payment of the construction charge thereunder in accordance with the provisions of section 7 of this act.

"SEC. 11. That the Secretary is hereby authorized to undertake a comprehensive and detailed survey of the physical and economic features of each existing project, and to classify the irrigable lands thereunder in accordance with the provisions of section 5 of this act.

"SEC. 12. That when a classification of lands under this act shows, in the opinion of the Secretary, that any such land is unsuited for immediate cultivation and unable to support a family and pay water charges at the present time, the Secretary may suspend the payment of such charges in whole or in part until such time as the land in his opinion is found suitable for cultivation and able to support a family and pay water charges.

ACRE COSTS NOT EXCESSIVELY HIGH

SINCE the acre costs, in most cases, do not seem to be excessively high, adjustments of cost should be made where errors have occurred, of a kind that should not be borne by the water user, or where definite agreements were made which have not been carried out, or where the earning power of the land does not justify the costs. Cost reductions, however, involve great difficulties of determination. After a long period, it may be practically impossible to sift the details with such fairness as to make a just recommendation concerning reductions in cost. On the contrary, it may be much the better method, in view of the fact that the present costs are reasonable, to devise a method of repayment that will make the annual burden on the farmer so slight as to make it relatively easy for him to meet the charges imposed.—Report of Committee of Special Advisers on Reclamation.

"SEC. 13. That when it shall have been definitely determined by the Secretary that any project land classed as irrigable and subject to the payment of water charges, is in fact unsuitable for cultivation by irrigation and can not by cultivation produce a return sufficient to support a family and pay water charges, such land may be eliminated from the project as nonirrigable, and the amount of the charges assessed against the same shall then be definitely charged off as a loss to the reclamation fund.

"SEC. 14. That the Secretary is hereby authorized, after making a proper survey of all existing projects and a classification of lands as provided in this act, to make, in each case where it is ascertainable from such survey and classification that the present water charges per acre are more than the land can bear, such fair and equitable adjustment of construction charges as in his opinion will fix a charge per acre which the land can reasonably bear. Any difference between the construction charge as adjusted and the

original charge shall be charged off as a loss to the reclamation fund.

"SEC. 15. That in any adjustment of water charges as provided in this act, all due and unpaid charges, both on account of construction and on account of operation and maintenance, including interest and penalties, may, in the discretion of the Secretary, be added in each case to the total obligation of the water user, and the new total thus established shall then be the construction charge against the land in question.

"SEC. 16. That every entryman on a project farm unit not yet patented, which unit has been classified by the Secretary as being insufficient to support a family and pay water charges, shall have the right upon request to exchange his entry for another farm unit of unentered public land on the same or another project, in which event all installments of construction charges theretofore paid on account of the relinquished farm unit shall be credited on account of the new farm unit taken in exchange: *Provided*, That where two entrymen apply for the same farm unit under the exchange provision of this section, only one of whom is an ex-service man as defined by the joint resolution of January 21, 1922 (Forty-second Statutes, page 358), the ex-service man shall have a preference in making such exchange.

"SEC. 17. That the Secretary is hereby authorized to employ trained farm and economic advisors who will give farming and business advice to enable water users on the projects to increase their farm incomes and organize for cooperation in business and social affairs.

"SEC. 18. That all contracts providing for new projects and new divisions of projects shall require that all operation and maintenance charges shall be payable in advance. In each case where the care, operation, and maintenance of a project or division of a project are transferred to the water users, the contract shall require the payment of operation and maintenance charges in advance. That whenever an adjustment of water charges is made under this act the adjustment contract shall provide that thereafter all operation and maintenance charges shall be payable in advance.

"SEC. 19. That the cost and expense hereafter of the main office at Washington, District of Columbia, of the Bureau of Reclamation in the Department of the Interior, and the cost and expense of general investigations heretofore and hereafter authorized by the Secretary, shall be charged to the general reclamation fund and shall not be charged as a part of the construction or operation and maintenance cost payable by the water users under the projects.

"SEC. 20. That where, in the opinion of the Secretary, a right of way or easement of any kind over public land is required in connection with a project,

the Secretary may reserve the same to the United States by filing in the General Land Office and in the appropriate local land office, copies of an instrument giving a description of the right of way or easement and notice that the same is reserved to the United States for Federal irrigation purposes under this act, in which event entry for such land and the patent issued therefor shall be subject to the right of way or easement so described in such instrument; and reference to each such instrument shall be made in the appropriate tract books and also in the patent.

"SEC. 21. That where real property or any interest therein heretofore has been, or hereafter shall be, donated and conveyed to the United States for use in connection with a project, and the Secretary decides not to utilize the donation, he is authorized without charge to reconvey such property or any part thereof to the donating grantor, or to the heirs, successors, or assigns of such grantor.

"SEC. 22. That there is hereby authorized to be appropriated from the general Treasury, the sum of \$100,000 annually for five years for investigations to be made by the Secretary through the Bureau of Reclamation to obtain necessary information to determine how arid, swamp, and cut-over timber lands may best be developed in the future to meet the growing agricultural needs of the Nation.

"SEC. 23. That the Secretary is hereby authorized, under regulations to be promulgated by him, to make short-time loans from the reclamation fund to entrymen upon projects, not to exceed \$600 at any one time to any person, for the purchase of necessary livestock and equipment, and provision shall be made for the repayment of such loans in amortized installments during a period of not to exceed five years with interest on deferred payments at 5 per centum per annum, computed from the date of the contract: *Provided*, That no such loan shall in any case exceed 60 per centum of the cost of the livestock and equipment purchased. Such loans shall be secured by chattel mortgage upon such livestock and equipment."

The second bill authorizing appropriations from the reclamation fund to provide for the investigation and construction of certain Federal irrigation works follows:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are authorized to be appropriated out of the special fund in the Treasury of the United States created by act of June 17, 1902 (32 Stat., 388), and therein designated "the reclamation fund," to be available immediately, sub-

FINANCIAL CONDITION OF FARMERS ANALYZED

The following analysis by the Committee of Special Advisers on Reclamation of the financial condition of the farmer on the Federal irrigation projects points out the path for the future:

1. The obligation to the Government must be recognized as the basis of success.

2. Payment must be based upon productivity, not time.

3. The per cent of gross income to be paid on construction charges must be fixed, taking into consideration the other fixed annual obligations of the farmer.

4. The farmer must learn to take advantage of every technical and practical aid for increasing gross income by intensive, diversified agriculture.

5. Government, Nation, and State must aid in providing technical advice and demonstration.

6. A system of credit, based upon sound business principles, must be provided, and cooperative methods of buying and selling must be adopted.

7. The farmer must practice thrift and avoid useless expenditure.

ject to the applicable provisions of the reclamation law.

"North Platte irrigation project, Nebraska-Wyoming: For continued investigations, commencement of construction of the Guernsey Reservoir and incidental operations, \$800,000.

"Spanish Springs irrigation project, Nevada: For continued investigations, commencement of construction and incidental operations, \$800,000.

"Owyhee irrigation project, Oregon: For continued investigations, commencement of construction and incidental operations, \$1,250,000.

"Vale irrigation project (formerly called Warm Springs), Oregon: For continued investigations, and for first payment toward purchase of an interest in the Warm Springs Reservoir, \$250,000.

"Salt Lake Basin irrigation project, Utah: For continued investigations, commencement of construction, and incidental operations, \$1,500,000.

"Yakima irrigation project, Washington: For continued investigations, commencement of construction of the Kittitas division, and incidental operations, \$1,500,000.

"SEC. 2. That no part of any sum provided for herein shall be expended for construction on account of any division of any project until an appropriate repayment contract, in form approved by the Secretary of the Interior, shall have been properly executed by a district or districts organized under State law, embracing

the lands irrigable under such division, and the execution thereof shall have been confirmed by decree of a court of competent jurisdiction, which contract, among other things, shall contain an appraisal approved by the Secretary of the Interior, showing the present actual bona fide value of all such irrigable lands fixed without reference to the proposed Government development, and shall provide that until the Government construction charges against such lands shall have been fully paid, upon any and every sale of the land or any interest therein, 50 per centum of all moneys, credits, and property received therefor above the value thereof as shown by said appraisal, shall belong to the United States to be credited in reduction of the construction charge against the land so sold, and the Secretary of the Interior may convert into money through legal process if necessary any such credits or property so belonging to the United States; and all public lands irrigable under such division shall be entered subject to the conditions of this proviso which shall be applied thereto: *Provided further*, That no part of any sum provided for herein shall be expended for construction on account of any division of any project until all areas of land irrigable under such division and owned by any individual in excess of one hundred and sixty irrigable acres, shall have been conveyed in fee to the United States free of encumbrance to again become a part of the public domain, under a contract between the United States and the individual owner providing that the value as shown by said appraisal of the land so conveyed to the United States shall be credited in reduction of the construction charge thereafter to be assessed against the land retained by such owner; and lands so conveyed to the United States shall be subject to disposition under the reclamation law when so ordered by the Secretary of the Interior: *And provided further*, That no part of any sum provided for herein shall be expended for construction on account of any division of any project until an appropriate contract in form approved by the Secretary of the Interior shall have been properly executed by all holders of Federal land grants of more than one hundred and sixty acres irrigable under such division, which shall provide for the sale of such lands to actual bona fide settlers at not more than the value thereof as shown by said appraisal: *And provided further*, That the provisions of this section shall not apply to lands to be served with water from the Guernsey Reservoir of the North Platte irrigation project, to lands to be served with water under the Warren Act of February 21, 1911 (Thirty-sixth Statutes, page 925), nor to Indian lands in any project."

PICTORIAL LESSONS IN PRACTICAL IRRIGATION

LESSON No. 5



Irrigation furrows following the contour of the land

IRRIGATION of rough land is always difficult. Pools of water form in the lower lying places, while the higher lying ridges receive less water than is needed. Unnecessary seepage and alternations of spots of good and poor crops are the result of the irrigation of rough lands.

Irrigation of steep, sloping lands is equally unsatisfactory. Water flowing down steep slopes, unless carefully controlled, by its velocity cuts into the lands;

soil is washed away, and gullies are formed.

The preservation of the lands, as well as the uniform distribution of water over the fields, require that irrigated lands be leveled, and that farm distribution systems be constructed which correspond to the contour of the land.

It is practically impossible, without an undue expense, to make the land of an irrigated farm perfectly level. It becomes necessary, therefore, after reasonable leveling has been done, to build farm ditches that will carry the water uniformly to all parts of the field without gullying the lands.

In the above picture the curving furrows show the contour of the land. Each furrow follows a line of approximately the same level. By this method land which is not wholly level may be irrigated successfully. In many parts of the irrigated section the expense of leveling is materially reduced by giving more attention to the layout of the farm ditches and irrigation furrows.

THE WINDBREAK AS A FARM ASSET

Windbreaks are, in more ways than one, a farm asset. They tend to prevent the soil from drying out quickly, and they protect grain and orchards from mechanical injury by wind. A belt of trees by the farm buildings protects them from extreme winter cold and summer heat, and makes the farm a pleasanter place in which to live. The windbreak may also be a source of wood supply for use on the farm or for sale.

Farmers' Bulletin No. 1405, issued recently by the United States Department of Agriculture, tells how windbreaks act and what returns may be expected from them in dollars and cents.

SAVINGS EFFECTED BY ELIMINATION OF NOTES

The weekly publication of "RECLAMATION NOTES" by the Denver office of the Reclamation Bureau has been discontinued.

The reason for this action was to save an expense of \$1,680, annually, which has been borne by the water users of the various projects. The original purpose of the "RECLAMATION NOTES" was to help in building up and maintaining a morale among the employees of the bureau, but considering the present financial conditions on the project it was decided the usefulness of the weekly publication did not justify the expense.

FAIR-PRICED LAND AWAITS RIGHT MAN

It was brought out at the recent Montana Land Settlement Congress, held at Helena, Mont., that in the opinion of many the bottom has been reached both in deflation of land values and agricultural commodities, and that Iowa and eastern South Dakota farm lands are now firmly on a basis of around \$250 per acre. If this is true, is there any reason why Nebraska, South Dakota, and Montana irrigated lands that can be had in quantities at \$50 to \$100 per acre, where sugar beets are the best crop and twice as remunerative as corn and hogs, should not be most attractive to the hard-headed Illinois and Iowa farmer?

CORRECT IRRIGATION PRACTICE NECESSARY TO FARMERS

Use of water on fields and the method of distributing it over the land should be the subject of intense study by settlers in order to assure successful crops

(By Dr. John A. Widtsoe)

This is the last of a series of three articles on the Principles of Irrigation Practice by Dr. John A. Widtsoe, former president of the Utah Agricultural College and the University of Utah.

THE basin method.—The basin method is practically identical with the check method. It refers to checks in orchards with a tree in the center of each, and with temporary levees. Earth is heaped around the tree trunks to keep the water away from the bark. This method is used especially in mild climates where fall or winter irrigation is practiced. The use of this method is also rapidly decreasing, and is likely soon to pass out of practice. The advantages and disadvantages of this method of irrigation are those discussed under the check method.

The furrow method.—In this method of irrigation small furrows leading from the supply ditch traverse the fields to be irrigated. Water flows down the furrows and is absorbed by the soil. Next to the method of flooding by field ditches, this is the most common method of irrigation, and it promises, at least in America, to supersede all other methods.

After the crop has been planted, small furrows leading from the supply ditch at the head of the field are made to cover the field by some of the many kinds of markers for furrowers. This process of furrowing the land is known as "marking" or "laying off" the land. The furrows are made at right angles to the supply ditch, or, if the land is irregular in contour, they are made to follow the contour lines. This is done, especially, in orchards where trees grow on the hill-sides. It is not an uncommon sight in such districts to see 30 or 40 furrows filled with water zigzagging down a hillside.

The furrows are made from year to year, except in the case of alfalfa and other perennial crops. Alfalfa, when irrigated by this method, is furrowed the first year, and the permanent furrows are only deepened or cleaned out from year to year. The disadvantage of the permanent furrows is that as the mower travels across them the rider is shaken up considerably and the machine is injured. In wheat fields, furrows are laid off soon after the wheat is planted, when it is about 3 or 4 inches high. Fields of sugar beets, potatoes and similar crops are furrowed just before the first irrigation. One furrow is ordinarily made between every two rows of plants, although on

some soils the distance between furrows is greater. In orchards, the furrows are usually made at the time of the first irrigation. When the trees are young, one furrow is made on each side of each row, perhaps 2 feet or a little more away from the tree. As the tree becomes older and the root-system expands, the furrow is moved away from the tree until, as the tree approaches maturity and more water is needed, three or four furrows may be made between two rows of trees. The principle in spacing the furrows is that the furrows shall be so close together that the water soaking from the furrows into the soil will meet and thoroughly saturate the soil below the surface. In orchards where trees are 16 to 20 feet apart, one furrow can not do this and several furrows are employed. The reason for using only one furrow when the tree is young is that the roots have not spread sufficiently to make use of water that might be applied half way between the rows of trees; and, moreover, the young tree needs little water. Fewer and deeper furrows are now generally used in the irrigation of orchards and other crops. Fortier and others have shown that the deep furrow has a decided advantage over the shallow furrow.

The furrow method is in many ways an ideal method of irrigation. It enables the farmer to control the quantity of water added to a soil. It makes it possible to spread a small quantity of water over a relatively large area of land. It prevents the washing and consequent destruction of the light soils characteristic of arid regions. It reduces evaporation; tends to prevent over-irrigation, and, because of the ease with which the furrow may be covered, soon after irrigation, the rise of alkali is delayed. There is little disturbance of the top soil, and baking is largely eliminated. The system once laid off requires little attention; one man can irrigate a large number of acres in one day. The method is inexpensive.

The furrow method of irrigation also has some disadvantages. Large heads of water cannot be used in the small furrows. It may be desirable, especially, in the spring, to apply quickly a large quantity of water to a given field. This is practically impossible with the furrow method of irrigation. It is difficult to admit the same quantity of water to each of the many furrows. Special attention must, therefore, be given to establishing

checks in the supply ditch at suitable intervals, to force, as nearly as may be, the same quantity of water into each furrow. Tubes or lath boxes, connecting the furrows with the supply ditch, are helpful in establishing a steady flow in each furrow. The uniform use of water throughout the length of the furrow is very difficult. On sandy soils, especially, the upper end of the furrow absorbs so much water that little is left for the lower end. In fact, when the furrow is long, it frequently happens that the water disappears before the lower end is reached. The best way to overcome this difficulty is probably to shorten the furrows, and to have a series of temporary supply ditches for each series of furrows.

Finally, the soil is benefited by being occasionally covered with water. The Utah work showed that, with a given quantity of water, as large yields were invariably obtained when the water was applied by flooding as by furrowing, in spite of the greater loss by evaporation under the flooding method. It may be well, therefore, to allow the water to overflow occasionally even under the furrow method of irrigation. The same effect may be obtained in part by placing the furrows differently from year to year. Meanwhile, the furrow method, with a given quantity of water, will yield as heavily as will the flooding method, and may yield more.

Summary.—In brief, there are, in practice, only two great methods of irrigation: (1) flooding by field ditches, and (2) furrowing. The field-ditch method is in reality a furrowing method, in which the water overflows the banks of the furrows. On certain soils and under certain conditions the field-ditch method will be found most serviceable; on others, the furrowing method. The closed-field methods are likely to vanish quite rapidly because of the large expense of installation and the want of elasticity in the system. The method of irrigation by furrows will probably triumph as the great method of applying water to soils for the production of crops. At the present time the field-ditch and the furrowing methods are in chief use.

At Tieton dam, on the Yakima project, 14 tons of TNT were fired recently in four holes, and 130,000 cubic yards of earth and rock loosened for excavation.

BUREAU IS REORGANIZED

IN order to comply with the recommendations made in the special advisory committee's report, a reassignment of duties and a change in titles of various officials of the Bureau of Reclamation, including the organization of the new finance division, have been effected. The new organization follows:

Commissioner.—Under the supervision of the Secretary of the Interior, the Commissioner of the Bureau of Reclamation, with office at Washington, D. C., shall have charge of all work of the bureau. The commissioner shall report to the Secretary of the Interior.

Chief Engineer.—Under the supervision of the commissioner, the chief engineer,

with office at a point designated by the Secretary of the Interior (now Denver), shall have charge of the operation of irrigation works and all engineering work, including reconnaissance, investigation, design, and construction and such other work as may be assigned. The chief engineer shall report to the commissioner.

Director of Finance.—Under the supervision of the commissioner, the director of finance, with office at a point designated by the Secretary of the Interior (now Denver), shall have general supervision of the collection of water charges and all other financial matters in the bureau pertaining to and including irrigation works, field counsel, chief clerks of irrigation

works and their forces, and traveling fiscal inspectors. The director of finance shall report to the commissioner.

Director of Farm Economics.—Under the supervision of the commissioner the director of farm economics, with office at a point designated by the Secretary of the Interior (now Denver), shall have charge of crop production, handling and marketing, improvement of farm conditions, industrial betterment, and settlement of lands. The director of farm economics shall report to the commissioner.

Chief Counsel.—Under the supervision of the commissioner and the Solicitor for the Department of the Interior, with office at Washington, D. C., the chief counsel shall be the principal legal adviser of the commissioner and perform such other legal duties as may be assigned.

District Counsels.—Under the supervision of the commissioner and director of finance, with offices at points designated by the commissioner, district counsels shall have charge of all legal work in their respective districts. District counsels shall report to the chief field counsel.

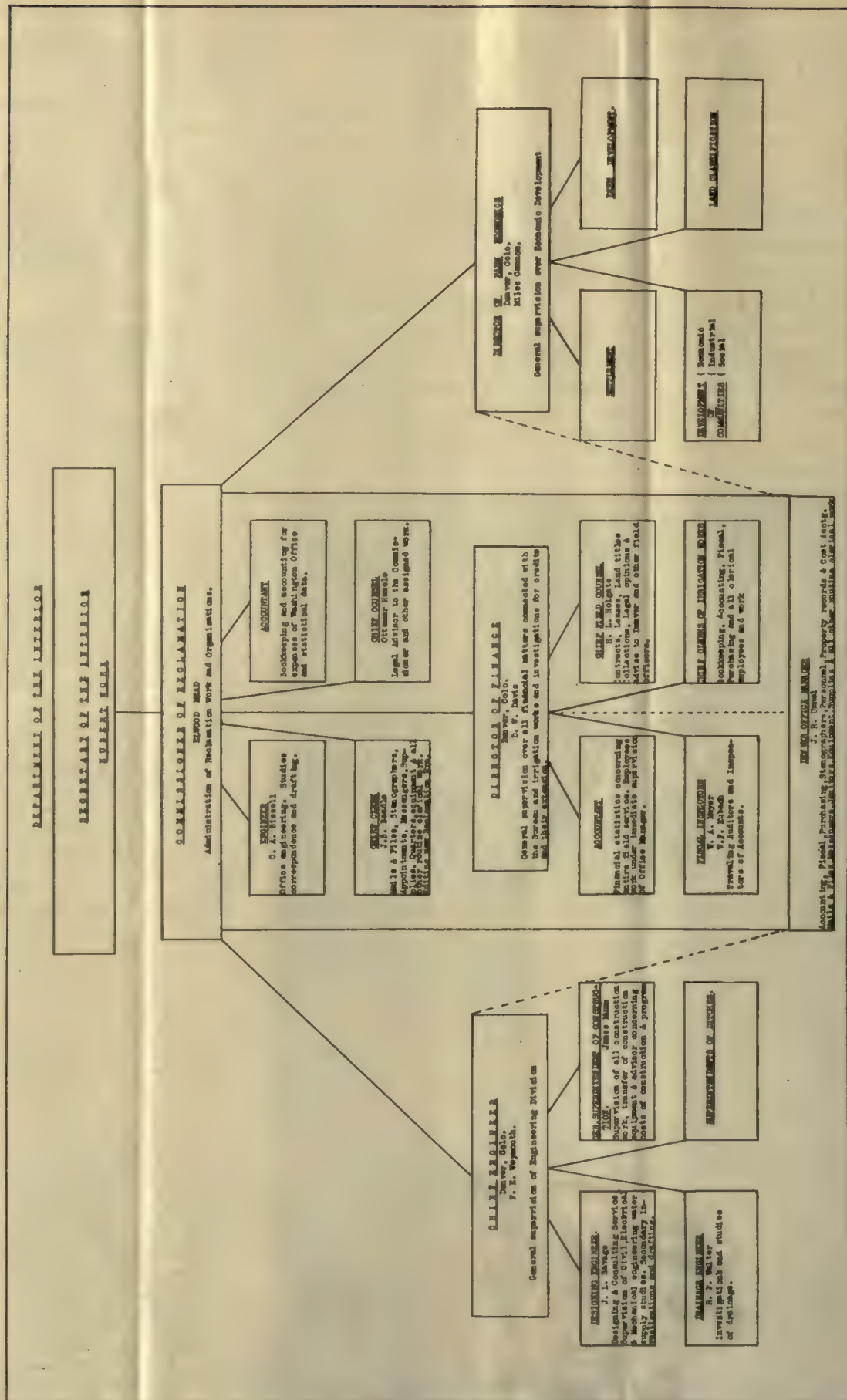
Superintendents of Ditches.—Under the supervision of the commissioner and chief engineer, superintendents of ditches, with offices at points designated by the commissioner, shall have charge of the work relating to irrigation in their respective districts, with the exception of financial matters, including accounting, bookkeeping, and purchasing. Superintendents of ditches shall report to the chief engineer.

Chief Clerks of Irrigation Districts.—Under the supervision of the commissioner and director of finance, chief clerks of irrigation districts with offices at points designated by the commissioner, shall have charge of the accounting, bookkeeping, purchasing, and all clerical work and employees in their respective districts. Chief clerks of irrigation districts shall report to the director of finance.

Denver Office Manager.—Under the supervision of the commissioner, with office at Denver, Colo., the office manager shall have charge of quarters, equipment, and supplies, and supervision of all stenographers, accountants, bookkeepers, purchasing agents, fiscal agents, messengers, janitors, telephone operators, and all other employees engaged in routine clerical work in the Denver office. His forces shall function for the offices of the chief engineer, the director of finance, and the director of farm economics, and he shall be responsible to the commissioner for keeping all work and other matters at the highest point of efficiency, and shall supply upon demand from the chief engineer, the director of finance, and the director of farm economics such necessary clerical services as may be required by them.



Graded potatoes from the Minidoka project



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Boise, Idaho.—B. E. Stoutemyer, district counsel. Projects: Boise, Minidoka, King Hill, and Jackson Lake Enlargement.

Denver, Colo.—R. M. Patrick and Armand Offutt, district counsel.

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Portland, Ore.—....., district counsel. Post Office Building. Projects: Yakima, Okanogan, Umatilla, Klamath, and Baker.

San Francisco, Calif.—P. W. Dent, district counsel, 349 Pacific Building. Projects: Salt River, Yuma, Orland, and Newlands.

THE NEW RECLAMATION ERA is published every month by the Bureau of Reclamation of the Department of the Interior, Washington, D. C. It is printed by the Government Printing Office, Washington, D. C.

Copies of the **NEW RECLAMATION ERA** are sent regularly without direct charge to the water users of the reclamation projects constructed and operated by the Government. Persons desiring to subscribe for the **NEW RECLAMATION ERA**, other than water users, may secure it for the price of 75 cents per year, payable in advance. Subscriptions should be sent to the Chief Clerk, Bureau of Reclamation, Washington, D. C., and remittances in the form of postal money order or New York draft should be made payable to the Special Fiscal Agent, Bureau of Reclamation. Postage stamps are not acceptable in payment of subscription.

PRESIDENT COOLIDGE SENDS COMMITTEE REPORT TO CONGRESS

ON April 21 President Coolidge transmitted to Congress, with the following message, the report of the Committee of Special Advisers on Reclamation to the Secretary of the Interior:

"TO THE CONGRESS OF THE UNITED STATES:

"I would respectfully urge on Congress the immediate necessity of revising the present reclamation law.

"The Secretary of the Interior appointed a special advisory committee of six members to study reclamation and make report to him. That committee has completed its work and has made its report to the Secretary of the Interior, and he has transmitted that report to me. I herewith transmit it to you.

"Many occupants of our reclamation projects in the West are in financial distress. They are unable to pay the charges assessed against them. In some instances settlers are living on irrigated lands that will not return a livelihood for their families and at the same time pay the money due the Government as it falls due.

"Temporary extensions of time and suspension of these charges serve only to increase their debts and add to their hardships. A definite policy is imperative, and permanent relief should be applied where indicated. The heretofore adopted repayment plan is erroneous in principle, and in many cases impossible of accomplishment. It fixes an annual arbitrary amount that the farmers must pay on the construction costs of projects regardless of their production.

"In its place should be substituted a new policy providing that payments shall be assessed by the Government in accordance with the crop-producing quality of the soil.

"The facts developed by the special advisory committee show that of the Government's total investment \$18,861,146 will never be recovered. There will be a probable loss of an additional \$8,830,000. These sums represent expenditures in the construction of reservoirs, canals, and other works for the irrigation of lands that have proven unproductive. I recommend that Congress authorize the charging off of such sums shown to be impossible of collection.

"Because of high rates of interest and other agricultural difficulties existing farmers are often unable to borrow money for temporary relief. The establishment of a credit fund by the Government from which farmers on projects may secure capital to make permanent improvements, buy equipment and livestock, should be considered.

"More than 30,000 water users are affected by the present serious condition. Action is deemed imperative before the adjournment of Congress, that their welfare may be safeguarded.

"The probable loss and the temporary difficulties of some of the settlers on projects does not mean that reclamation is a failure. The sum total of beneficial results has been large in the building up of towns and agricultural communities and in aiding tremendously to the agricultural production and wealth of the country. Whatever legislation is necessary to the advancement of reclamation should be enacted without delay.

"CALVIN COOLIDGE.

"The White House, April 21, 1924."

NEW RECLAMATION ERA

VOL. 15

JUNE, 1924

NO. 6



DIGGING PEDIGREED POTATOES ON THE MINIDOKA PROJECT, IDAHO

THE final test of the success of any irrigation project is the possibility under that project to produce a comfortable living, under satisfactory environment, for the family on the farm, and at the same time to meet all the financial obligations of life including the cost of reclamation and development of the land. This implies that the land must have a crop productivity sufficient to justify the farmer and his family in their labors and in their investment of reclaiming and developing the land. Productivity, therefore, is one of the main considerations in the selection and development of an irrigation project.

*—Report of Committee of Special
Advisers on Reclamation*

NEW RECLAMATION ERA

Issued monthly by the Department of the Interior, Bureau of Reclamation, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 15

JUNE, 1924

No. 6

THE 1924 RELIEF ACT AND DEPARTMENT'S REGULATIONS

Full text of the new relief law of May 9, 1924, concerning water charges, together with rules and regulations thereunder issued by the Secretary of the Interior

BELOW is printed the relief act of May 9, 1924 (Public No. 115), with regulations approved by the Department on June 2, 1924:

1. The following is the complete text of the above named act:

An Act to authorize the deferring of payments of reclamation charges.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled—

That the Secretary of the Interior is hereby authorized and empowered, in his discretion, to defer the dates of payments of any charges, rentals, and penalties which have accrued prior to the 2d day of March, 1924, under the Act of June 17, 1902 (Thirty-second Statutes at Large, page 388), and amendatory and supplemental acts, or prior to that date as against water users on any irrigation project being constructed or operated and maintained under the direction of the Commissioner of Indian Affairs, as may, in his judgment, be necessary in or concerning any irrigation project now existing under said act: *Provided*, That no payment shall be deferred under this section in any particular case beyond March 1, 1927: *Provided*, That upon such adjustment being made, any penalties or interest which may have accrued in connection with such unpaid construction and operation and maintenance charges shall be canceled, and in lieu thereof the amount so due, and the payment of which is hereby extended, shall draw interest at the rate of 5 per centum per annum, paid annually from the time said amount became due to date of payment: *And provided further*, That in case the principal and interest herein provided for are not paid in the manner and at the time provided by this section, any penalty now provided by law shall thereupon attach from the date of such default.

SEC. 2. That where an individual water user, or individual applicant for a water right under a Federal irrigation project constructed or being constructed under the act of June 17, 1902 (Thirty-second Statutes at Large, page 388), or any act amendatory thereof or supplementary thereto, makes application prior to January 1, 1925, alleging that he will be unable to make the payments as required in section 1 hereof, the Secretary of the Interior is hereby authorized in his discretion prior to March 1, 1925, to add such ac-

crued and unpaid charges to the construction charge of the land of such water user or applicant, and to distribute such accumulated charges equally over each of the subsequent years, beginning with the year 1925, or, in the discretion of the Secretary, distribute a total of one-fourth over the first half of the remaining years of the twenty-year period beginning with the year 1925, and three-fourths over the second half of such period, so as to complete the payment during the remaining years of the twenty-year period of payment of the original construction charge: *Provided*, That upon such adjustment being made, any penalties or interest

MORE EXTRACTS FROM COMMITTEE'S REPORT

Owing to the interest of the water users in the recent report to the Secretary of the Interior by the Committee of Special Advisers on Reclamation, it has been decided to devote the larger part of this issue to the publication of additional extracts from the report.

which may have accrued in connection with such unpaid construction and operation and maintenance charges shall be canceled, and in lieu thereof the amount so due, and the payment of which is hereby extended shall draw interest at the rate of 5 per centum per annum, paid annually from the time said amount became due to date of payment: *Provided further*, That the applicant for the extension shall first show to the satisfaction of the Secretary of the Interior detailed statement of his assets and liabilities and probable inability to make payment at the time required in section 1: *And provided further*, That in case the principal and interest herein provided for are not paid in the manner and at the time provided by this act, any penalty now provided by law shall thereupon attach from the date of such default: *And provided further*, That similar relief in whole or in part may be extended by the Secretary of the Interior to a legally organized group of water users of a project, upon presentation of a sufficient number of individual showings made in accordance with the foregoing proviso to satisfy the Secretary of the Interior that such extension is necessary.

SCOPE OF THE ACT

2. The act applies to all Federal irrigation projects constructed or being constructed under the reclamation law, and likewise to irrigation projects under the jurisdiction of the Commissioner of Indian Affairs. These regulations, however, apply only to the projects constructed or being constructed under the reclamation law. The act is a temporary relief measure and authorizes the Secretary to allow two kinds of time extensions on all reclamation charges due prior to March 2, 1924, to wit, (a) an extension of time on such charges for a period or periods not beyond March 1, 1927, hereafter referred to as relief under section 1; and (b) an extension of time where the water user is unable to make the payments as required in (a) by distributing such charges over the remaining construction installments, hereafter referred to as relief under section 2.

RELIEF UNDER SECTION 1

3. Under this section the Secretary is authorized in his discretion to extend the date or dates of payment of any and all unpaid construction charges, operation and maintenance charges, and water rental charges due prior to March 2, 1924. No such charge can be extended beyond March 1, 1927, and all such charges extended, in lieu of any penalties now provided by law, will draw interest at the rate of 5 per centum per annum, paid annually from the time they originally became due and payable. If unpaid at the end of the extension period any and all penalties as provided by the reclamation law will attach from the date of such default.

RELIEF UNDER SECTION 2

4. In cases where the relief described in the preceding paragraph would be insufficient, the Secretary is authorized in his discretion under section 2 of said act to distribute the accrued and unpaid

(Continued on page 86)

THE RELIEF ACT AND REGULATIONS

(Continued from page 85)

construction, operation, and maintenance and water rental charges due prior to March 2, 1924, equally over each of the remaining construction installments beginning with the year 1925, or to distribute one-fourth of such accrued charges over the first half of the remaining construction installments and three-fourths over the second half of such installments. All of such charges extended, in lieu of any penalty now provided by law, will draw interest at the rate of 5 per centum per annum paid annually from the time said amount became due to date of payment and in case of default in the payments as extended, any and all penalties now provided by law will attach from the date of such default.

GENERAL POLICY

5. Good policy and good faith both require that so far as possible repayments to the Government be not unreasonably postponed. Those water users who have credits and assets making it possible for them to pay all or part of their obligations due the United States will be expected to do so. At the same time this measure will be applied sympathetically for the benefit of those not now able to pay, but who are exerting themselves to reclaim their lands and to carry out their contracts with the United States. In this connection it becomes appropriate to give consideration to the report recently submitted by the Committee of Special Advisers on Reclamation. As a result of the recommendations contained in this report, and in furtherance thereof, a bill has been introduced and is now pending in Congress to authorize the Secretary to undertake a comprehensive and detailed survey of the physical and economic features of each reclamation project and to provide for an equitable readjustment of all existing accounts. The proposed bill, if enacted into law, will result in the institution of a more scientific system of repayment, and pending its consideration by Congress it is believed advisable to limit the administration of the present relief law to the extensions provided for in section 1 thereof. To that end, and during the present session of Congress, only relief applications under section 1 will be considered. Those desiring to apply for long extensions as provided for in section 2 will be afforded ample opportunity to do so at a date to be later announced and prior to the time limit as named in that section, that is, January 1, 1925.

PROCEDURE BY APPLICANT

6. Every person who desires to obtain an extension under section 1 of this act must file a written request therefor in the

office of the project chief clerk. The request must state the kind of charges owing, that is, construction, operation, and maintenance, or water rental, the length of the extension desired (limited, of course, by the provisions of the section to not beyond March 1, 1927), and, briefly, the conditions and circumstances that make such extension necessary. No set form of application will be required as a basis for relief under this section, but the project chief clerk may find it advisable to prepare and distribute mimeographed copies of the three necessary requirements as stated above.

PROCEDURE BY THE UNITED STATES

7. The board of directors of the local water users' association or irrigation district will be requested to take action on requests for relief. Following recommendation by such board the application will be considered by the chief clerk in connection with such data as are available in his office, notably other relief applications by the same party and data touching the general conditions of the unit in question and the division of the

project involved, and render decision thereon either denying or allowing the relief sought. In cases where the chief clerk fully approves the request of the applicant, his decision shall be final; in all other cases the application shall be referred to the director of finance at Denver for consideration. In the absence of an appeal, decision of the director will be final. Appeal will lie from the director's decisions to the commissioner and from the commissioner's decision to the Secretary of the Interior.

RELIEF TO ORGANIZED GROUP OF WATER USERS

8. Extension of time may likewise be granted to a legally organized group of water users such as an irrigation district or a water users' association. Application for such extension must comply with the same requirements laid down for the individual and such application will be submitted with appropriate recommendations by the chief clerk through the director of finance to the commissioner for action.

ELWOOD MEAD,
Commissioner.

Approved, June 2, 1924.

HUBERT WORK,
Secretary.

RESOLUTIONS PLEDGE COOPERATION

THE following resolutions were adopted on April 18, 1924, by the Board of Directors of the Yuma Chamber of Commerce:

Whereas the Bureau of Reclamation has indicated a possible intention of inaugurating a campaign for the intensive settlement and development of one of the Government irrigation projects with a view of later carrying on similar campaigns on other reclamation projects until the financial success of all such projects is assured; and

Whereas we believe that the Yuma project, owing to its favorable geographic location, its abundant water supply, its uniformly excellent soil, its semitropic climate, its diversity of crops, its extensive system of consolidated schools, its favorable railway facilities, its abundance of good domestic water at shallow depths, its location on the coast-to-coast highway with paved roads to Pacific coast cities and graveled road connection with the Salt River district, and its exceptionally healthful climate, offers greater possibilities of intensive and successful settlement than are to be found on any other Government reclamation project or in fact in any other section of the United States; and

Whereas we find, after conference with many of the settlers and with the business organizations of the city of Yuma, including all banks, The Yuma County Water Users' Association, Mr. E. F. Sanguinetti, and the Southern Pacific Ry. Co., through its local agent, Mr. Geo. E. Wilson, that the fullest cooperation of the entire community for the promotion of such program is assured; and

Whereas there are already located within the confines of this project two Federal and two State experimental farms which will undoubtedly be of immediate and constant assistance in the fulfillment of the agricultural possibilities of the district; and

Whereas it is the earnest desire of the Yuma Chamber of Commerce to forward in every possible way the early settlement and maximum development of the Yuma project:

Now, therefore, be it resolved by the board of directors of the Yuma Chamber of Commerce, That it desires to offer, and does offer, every possible assistance and cooperation to the Bureau of Reclamation in any program of settlement and development that may be adopted by such bureau in connection with the Yuma project.

TECHNICAL AID TO SETTLERS NECESSARY FOR SUCCESS

It is first and foremost important to train the settler for his work, so that he will not fail because of the lack of knowledge with which to accomplish his task

IT IS highly important, says the Committee of Special Advisers on Reclamation in its report to the Secretary of the Interior, that those who undertake irrigation agriculture, under the changing economic conditions of to-day, be made as familiar as possible with the body of knowledge available to them in their work. Brief extracts from this chapter of the report follow:

The settler under the irrigation canal needs special knowledge of soils and crops with respect to their relationship to water, in addition to their general behavior for agricultural purposes. Without such specialized and general knowledge of agriculture the irrigation farmer is not likely to achieve high or lasting success. The reclamation problem, as presented by the Federal irrigation projects, is essentially one of irrigation agriculture. Important and indispensable as the engineering structures are, they only make the fundamental contribution to the success of a civilization under the ditch. The real test of success depends upon the ability of the man under the ditch, through a long succession of years, to win from the soil and the water a comfortable and satisfactory living for himself and his family and to pay his obligations. It is of first and foremost importance to train him for his work, so that he will not fail because of the lack of knowledge with which to accomplish his task. This has been a potent cause of the difficulties that have beset the Federal reclamation experiment.

The study of the Federal irrigation projects has emphasized the great variety of soils and climatic conditions under which irrigation is or may be practiced in the United States. The proper methods of applying water in irrigation, and the results likely to follow such application, vary from place to place, as soils and climatic conditions vary. In fact, any system of agriculture on an irrigated farm must be determined with respect to prevailing conditions. Such careful experimental studies of the different projects have not yet been made. There should be on each project a small experimental station under Federal or State control, supported by means not taken from the reclamation fund for the experimental study of soil and crop conditions on the project under irrigation practice. On the basis of such findings, which should be correlated with those obtained elsewhere, different systems of agriculture for each project should be laid out and urged upon the water user. A good beginning has been made in this

work. The Department of Agriculture maintains such stations on seven of the projects, and on five others experimental stations are maintained by other public agencies. The number, however, should be increased, because of the great variety of conditions surrounding the projects.

ADAPT CROP SYSTEM TO ECONOMIC ENVIRONMENT

Undoubtedly, just as the acre yields of a project may be increased by wiser soil tillage and a better use of the irrigation water, so also the unit price may be held higher by a more careful study of the marketing opportunities surrounding the project, and by a better adaptation of the crop system to the economic environment of the project. In short, a careful study needs to be made of this matter from year to year, and placed at the disposal of the farmer for his guidance. The farmer himself is quite unable to do this work for himself. The work on his farm engages his attention and leaves him little time for this somewhat abstruse question.—Report of Committee of Special Advisers on Reclamation.

Even with ample experimental work, the farmer needs additional assistance, for experience has demonstrated abundantly that the farmer, as a rule, does not go to the experimental station to seek the information that he needs, nor does he always know how to apply the truths that the station gives him. Therefore, to make the information that the irrigation farmer needs available and effective, it becomes necessary to place demonstration agents on the projects, who can act as direct advisers to the farmer. These demonstrators take information, won by experimental stations, and bring it to the farmer, with suggestions as to how it should be applied. Such demonstration work is an indispensable part of the technical aid needed by the farmer.

It will be necessary, as has been done in the past, to have experts travel over the projects to give special information. Such men, trained in animal husbandry and in other subjects that do not vary greatly from project to project, have contributed much help to the project farmer, but a larger appropriation for this purpose is needed and would greatly stimulate project agriculture.

The project irrigation farmer, to make his work thoroughly satisfactory to him-

self and the Government, will require, for some time to come, much help on a great variety of subjects. Some one on the project having an intimate knowledge of the farmers' affairs should act as an intimate counsellor on various matters that arise to vex the farmer in his work. The nearest approach to such assistance at the present is that given by the project manager, the ditch rider, and such members of the engineering force as may be stationed on the projects. The engineers have special studies assigned to them, and can not take the time necessary to give such careful advice, even if they were in possession of the needed information. The ditch riders could be of greater assistance if they were specifically instructed and trained to give such matters their attention, but they also have special duties to perform, which must be done in a proper time and season. The project manager would seem to be the best person to act as chief adviser to the farmer. However, it is practically impossible, under present conditions, for the project manager to do this, for on the majority of the projects there are too many water users for one man's intimate supervision.

Since the reclamation problem is always essentially an agricultural, economic, and settlement problem, steps should be taken to bring the projects into the closest association with the State and Federal departments of agriculture. Some organic relationship should be effected between the Federal irrigation projects and the Department of Agriculture, by which the department could be made to feel direct and special interest in the projects.

There is a crying need for the formulation of definite systems of agriculture for the different reclamation projects. Competent experts should be called in to devise such plans, considering in each instance the water, soils, markets, and other factors of agricultural success. These agricultural systems should be printed and made available to the farmer, and followed up by the encouragement of the demonstrator and the project officers.

Definite steps should be taken to encourage the water users to purchase modern books on agriculture and to build up their agricultural libraries, and every water user encouraged to take one or more agricultural journals. THE RECLAMATION RECORD, now the NEW RECLAMATION ERA, should adopt a more definite policy of being a practical aid to the farmer, and should be made the most attractive and valuable journal entering the homes of the water users.

PROJECT MARKETS AND TRANSPORTATION FACILITIES

Committee of Special Advisers on Reclamation believes that changing the type of agriculture so that more concentrated products are sold will largely overcome the handicap of the long haul and the high freight rates

HOW to market the crops grown on the projects to the best advantage of the water users is a problem of increasing importance. This was fully recognized by the Committee of Special Advisers on Reclamation in its report to the Secretary of the Interior and is discussed at some length in a chapter on markets and transportation facilities, from which the following extracts are taken:

Farm crops are either consumed by the farm household or sold. The type of agriculture determines the relative proportion consumed or sold. Under a system of diversified farming, more of the products are consumed than under a single-crop system. Some of the farmer's crops must, of necessity, be marketed. Since a large proportion of the farmer's products must be sold, marketing becomes of the highest importance. The nature of the available markets, their distances from the farm, transportation rates, and all the complex factors that connect the producer and the consumer determine in a large measure the profitability of farming.

Since the projects are largely dependent upon the larger distant markets, freight rates assume great importance in making farming profitable on the Federal irrigation projects. One of the chief complaints of the Federal water users is that because of high freight rates it is impossible for them to ship their farm products to the larger markets of the Nation with any profit to themselves. A number of experiences have been cited to illustrate the large degree to which freight rates consume the prices of the products shipped. Most of the Federal irrigation projects are far from the large markets. Clearly, farms near the great consuming centers can place their products on the markets at a lower cost than the farms located far away.

Any discussion of the influence of markets and transportation facilities upon the farm profits must consider the nature of the crop which the farmer places on the market. Some of the projects make a business of shipping alfalfa; others feed the alfalfa on the project and ship butter, meat, or eggs. Farm profits increase when the farmer sells his farm products in a concentrated or manufactured form.

If concentrated crops were shipped more generally from the projects the question of freight rates would be of less importance. For instance, consider the

relative effect of shipping alfalfa or butter or sheep from the Idaho projects. Portland, Oreg., is the nearest large market to Boise, Idaho. It costs \$78 to ship 11 tons of alfalfa hay from Boise to Portland. If it be assumed that the farmer receives on the Portland market \$25 a ton for the alfalfa hay—an unusually high figure—the 11 tons would yield him \$275. The freight from Boise to Portland would then represent 28 per cent of the total amount received by the farmer on the

SELECTION OF CROPS OF GREAT IMPORTANCE

The project farmer needs to learn that he must not grow too large a proportion of crops that are perishable, because of the possible failure to market such crops at the right time, and that he must place his main dependence upon manufactured crops, such as are represented by livestock fed on the farm, and by such crops as may be sold to agricultural manufacturing establishments, such as the sugar and canning factories. It will be noted that quite a large acreage in project farms is devoted to the growing of wheat when the information available shows that wheat as a commercial crop is not usually profitable on an irrigated farm except as a nurse crop. Finally, he must avoid what may be spoken of as speculative crops, which sweep the country from time to time and throw out of balance the system of agriculture which has been gradually and patiently built up under normal conditions, and which throughout the years is the safe system to follow.—Report of Committee of Special Advisers on Reclamation.

Portland market. If, on the other hand, the farmer shipped a carload of 20,000 pounds of butter from Boise to Portland at the rate of \$253, and received 50 cents a pound on the Portland market, there would be \$10,000 worth of butter in the shipment, and the freight rate would be only 2.5 per cent of the amount received. If a carload of sheep were shipped from Boise to Portland, assuming that the Portland market paid 10 cents a pound, the freight would form only 5.5 per cent of the amount received for the carload.

Such comparisons illustrate the advantage in shipping concentrated instead of

raw farm products. A further calculation of the number of tons of alfalfa hay required to produce a carload of 20,000 pounds of butter, or a carload of 20,000 pounds of sheep, would show that to ship bulky, raw farm products is always an unprofitable undertaking. Changing the type of agriculture so that more concentrated products are sold will largely overcome the handicap of the long haul and the high freight rate.

Where specialized crops are grown, such as cotton, apples, or lettuce, there is a tendency to depend upon the cash income from these specialized crops for the purchase of the foods needed by the family and to omit a sufficient diversification to supply the major food needs of the family. This is a practice of doubtful value. The farmer's dependence upon markets and the prevailing prices of the commodities he must buy, that is, the purchasing power of the crops raised, would make it advisable to adopt a system of crop diversification that would supply the family with, as nearly as possible, all needed foodstuffs. After this has been provided for, the remainder of the acreage could be planned for cash crops. The future of irrigation farming, as perhaps of all successful farming, depends upon the development of the self-supporting farm home by the products of the farm. Were this practice more generally adopted, it would lessen the dependence of the farmer upon freight rates and market prices.

Experience had demonstrated the advantage of certain types of agriculture and kinds of crops. Yet under a more systematic and intelligent practice of agriculture, resulting in larger acre yields, the crop incomes per acre have been falling during the last few years. At the same time the purchasing power of most farm products is lower than it was eight or ten years ago. When this condition, which lies at the foundation of most of the financial difficulties of the project farmers, is corrected, the remaining difficulties will be disposed of easily. In the face of the agricultural depression there is a larger acreage of cropped land on the Federal irrigation projects than ever before. Since 1912 the total crop value of the Federal irrigation projects has increased more than fourfold.

The project difficulties resulting from marketing conditions and transportation facilities may be overcome by (a) securing legislation to equalize freight rates; (b) making every farm household more nearly self-supporting; (c) growing concentrated instead of bulky crops for shipment.

BASIC PRINCIPLES OF IRRIGATION PRACTICE OUTLINED

The Bureau of Reclamation and the water users should unitedly work to establish on the Federal irrigation projects an economical as well as a beneficial duty of water

THE Committee of Special Advisers on Reclamation in its report to the Secretary of the Interior points out that under the most extensive system of water storage and the most careful use of water, only a small portion, perhaps less than one-fifth, of the arid region may be brought under irrigation. Extracts from this chapter of the report are as follows:

The wise and economical use of water must be the main concern of all interested in the development of the projects, as well as in the development of the arid and semi-arid area of the country. In fact, it is not the quantity of water secured by irrigation structures that determines the area of irrigated land, but rather the manner in which the available water is used. The extent of reclamation, the character of agriculture under the ditch, and the permanence of a civilization built upon irrigation, depend upon the use of irrigation water; that is, upon irrigation practice.

It is an erroneous idea that the greater yields of crops obtained by the addition of large quantities of water increase the profits of the farmer. The returns from the use of a certain quantity of water are a safer basis on which to found our irrigation practice than the yield per acre, especially when land without water is very cheap and water for that land is very expensive. The true measure of the proper use of irrigation water is the water cost of the crop produced. How many tons of water were required to produce a ton of alfalfa or a bushel of wheat? Such questions are too often left unanswered by the farmer, but are of fundamental importance in the building of an irrigation practice which will help make our Federal irrigation projects, as well as other irrigation projects, prosperous and permanent.

The quantity of water used in irrigation affects definitely the growth of the plant. By varying the quantity of water it is possible to increase the total yield; to change the relative proportions of leaves, stems, roots, and seeds; to control measurably the composition of the crops produced, or to hasten or retard ripening. Under the most favorable conditions the irrigation farmer carries a burden above that of farmers in humid districts, since he has to pay for water and for its application. Any power to vary the growth or composition of the irrigated crop may be the determining factor in competition with the humid area. This indicates the importance of an intelligent system of irrigation practice on the Federal irrigation projects.

PREPARATION OF LAND NOT EASY FOR FARMER

It has now come to be realized that the preparation of land for irrigation is a task which requires the knowledge of the engineer and not that of the farmer. It requires tools for which the farmer has no use after the farm has been made ready for the proper distribution of water. The only safe basis for doing this work properly is an accurate contour survey. The size and direction of channels or borders can only be determined wisely by men with more knowledge and experience than the average farmer possesses. Leaving the inexperienced beginner to struggle along without aid or direction has wasted more money, brought more discouragement, and driven more settlers off their farms in the early years of development than can be realized by anyone except those who have lived on these settlements.—Report of Committee of Special Advisers on Reclamation.

The rational use of water considers not only the total quantity of water applied, but the methods of application. For example, irrigation may be applied by the flooding method, by which all the land is covered by water. This in turn is accomplished by one of several modifications, such as the border, check, or basin method. Or water may be applied by the furrow method of irrigation, which means that only a part of the land is covered with water, the other part remaining dry. Each method has decided advantages under certain conditions. The intervals between irrigation are of definite importance in determining the effect of the water upon the plant. The time of irrigation, keeping in mind the stage of development, is likewise of importance. Our best knowledge with regard to the methods of irrigation should be applied to win a permanent and successful civilization under the ditch.

Of almost equal importance with the total quantity of water applied and the method of its application is the system under which irrigation water is applied. By the constant-service system each water user receives a constant stream of water, small or great according to his water right. There are disadvantages inherent in this system, although it is very popular with the water user who

has not thought the thing out. The other and more satisfactory system is that of rotation, by which the farmer receives at regular intervals as large a stream of water as he can handle for a limited time. When irrigation is finished the water is taken by his neighbor, and he proceeds to other farm duties. This system is not so readily accepted by the farmer who has not been educated in irrigation practice. Meanwhile, on the Federal irrigation projects, which should be models for all other irrigation enterprises, such irrigation systems should be devised as will lead to the best results. The Bureau of Reclamation or the controlling water users' associations should distribute water only in accordance with the best known principles of irrigation practice.

It is a well established fact that wherever much water is available the duty of water is low; wherever little water is available the duty of water is high, and this without affecting materially the yield per acre. It is also a matter of common knowledge that under pioneer conditions the duty of water is low, whereas on older settled projects the duty of water is high. There is good reason to believe, therefore, that as restrictions are placed upon the use of water the duty of water will be increased—that is to say, less water will be used on each acre of land—and as the projects become older the general experience of farmers will lead them to use less water.

All available information concerning the duty of water should be assembled and placed at the disposal of the water user. Federal and State experimental agencies should undertake researches of the duty of water with the view of promoting the economical use of water in irrigation, so that by demonstration farms and farm advisers water users may be made thoroughly familiar with the methods to be employed in securing a high duty of irrigation water.

A survey should be made of the sources of loss of water on projects, such as leaky canals, shallow soils, porous subsoils, other large wastage, and the same be corrected.

The Bureau of Reclamation and the Federal water users should unitedly work to establish on the Federal irrigation projects an economical as well as a beneficial duty of water.

There is no doubt about the successful outcome of the Federal experiment in irrigation if the experience now gained be applied to existing and to coming projects.

COMMITTEE STRESSES PLACE OF POWER IN AGRICULTURE

Modern agriculture is becoming more and more dependent upon power in connection with the work on the farm and in the farmhouse—Future power development should keep this in mind

AN ATTRACTIVE feature of many of the Federal irrigation projects is the fact that power may be developed in connection with the operation of the irrigation works. This phase of the situation is discussed in the report of the Committee of Special Advisers on Reclamation, as follows:

In the construction of the Federal irrigation projects it was found that the power required for construction could best be secured by the construction of power plants, usually hydroelectric plants. When construction was completed, the cost of these power plants, yet in good working condition, was included in the construction cost of the project. Usually these power plants, after having served as adjuncts to construction, have been left on the projects. The power produced by them has been used for pumping water to higher lands, or for drainage, and the excess over and above the needs of project operation has been sold for general industrial purposes.

On 11 of the projects there are 18 power plants, which have cost the reclamation fund \$3,825,905.20. These power plants had an output, during the fiscal year 1922-23, of 177,038,638 kilowatt hours. A part of this power, 93,660,469 kilowatt hours, was sold to consumers, and another part, about 37,067,575 kilowatt hours, was used for irrigation purposes. The net revenue for the fiscal year ending June 30, 1923, was \$584,930.94. The service of these plants has not yet reached its full possibilities; neither has the possible service of power on the respective projects been fully developed.

Several of these power plants are operated by canal water during the irrigation season and are therefore idle in the winter. During the growing season when the canals are filled with water, the output of power is therefore greatest, which permits a larger use for pumping purposes to supply high-lying lands with water.

In addition to the project power plants already constructed, there are many power possibilities that will be used in the future. The building of irrigation works, implying the diverting of water from high-lying to lower-lying lands, necessarily furnishes power opportunities. On some projects these power opportunities are very large. The increasing need for power on the farm throughout the year and on the project for pumping purposes during the summer makes it



Diversion dam and power house. Boise project, Idaho

very certain that, as time goes on, these many power possibilities will be more carefully scrutinized with a view of constructing additional power plants.

The place of power in modern agriculture has been well established. The electric current has become the servant of the farmer, by the aid of which one

man is enabled to do several times the work that the farmer of old could do. The need for power on an irrigated farm is as legitimate as the need for water. Any future policy relative to the development of Federal reclamation should keep the power problem in mind. The water users, when they take over a project, should be allowed to operate the whole project as a unit, including the power plants that may be constructed; and further, no reservations should be made regarding possible power sites, except as to the permanent retention of existing power possibilities for the use of the project population.

In this connection the committee recommended that when the water users take over the management of a project, under contract with the United States, the total accumulated profits derived from the operation of project power plants should be credited to the construction cost of the project; and that, thereafter, the income from project power plants and power possibilities may be used as the water users direct for the benefit of the project. No dividend, however, should be paid out of any such profits before all obligations to the Government shall have been fully paid.

COLUMBIA BASIN REPORT DELAYED

The report on the feasibility of the proposed Columbia River Basin irrigation project in the State of Washington will not be submitted to Congress until the December session.

Delay in the findings of the commission investigating this project, of which Assistant Secretary of the Interior Francis M. Goodwin is chairman, is due to the necessity of revising and reviewing the engineering, agricultural, and economic data to conform to the recommendations contained in the recent report of the Special Advisory Committee on Reclamation.

Additional field surveys will be made during the coming summer on several areas in the Columbia River Basin in order to supply more complete data as to certain features of the project.

The other members of the commission are Dr. Elwood Mead, Commissioner of the Bureau of Reclamation, and F. E. Weymouth, chief engineer of the bureau.

The first duty of the Bureau of Reclamation is to help the water users, already under contract with the Government, to succeed upon their farm units.

COMMISSIONER MEAD'S ADDRESS AT THE DENVER OFFICE

Outlines new method of repayment and stresses necessity of building up a spirit of confidence and hope on the projects and of securing the cooperation of all in the work

IF THE changes recommended by the Committee of Special Advisers on Reclamation are approved by Congress, they will have a most helpful effect both on the water users and the Government.

One of the important recommendations is that hereafter the construction charges will not be based on the cost of the work, but on the returns from the farm. These works embrace all the western country from Montana to Texas. Climate is an important factor in determining the value of irrigation water, and must receive more attention in the future. The crops of highest acreage returns are produced in general where hot summers and a long growing season prevail. However, some of the costliest works are in the north, and as a result there is no relation between cost and the benefits that come from it.

In the beginning it seemed perfectly natural to base the payment of construction charges on costs instead of benefits; but that is not done in India, which has the largest investment in irrigation works. There the construction cost is returned from taxes on land values and on crop production; that is, payments for irrigation in India are based on the benefits received. The committee has incorporated that idea in its recommendations. It does not mean that any money will be lost, but that the rate of payment will be based on the ability of the farmers to pay. This will remove a great injustice in many cases.

Another necessary change is that we shall give attention to building up confidence and hope on the projects by helping the farmers to work out their agricul-

tural problems, increase the earning power of their farms, provide better marketing methods, and obtain greater money returns for their produce. How far we can go in that nobody can tell. It will depend somewhat on the general trend of agricultural prosperity; but undoubtedly it will bring us into close and harmonious relations with these struggling and discouraged people, and that alone is a great advantage.

The old idea that every man should "hoe his own row" worked all right under pioneer conditions, but we are living today in an era of cooperation which is especially necessary in agriculture. These projects, with their existing organizations and their common tie of dependence on the canal, furnish a unique opportunity to build up a spirit of cooperation; and that is one of the great new tasks which will be laid on us if Congress approves the recommendations of the committee.

The committee divided the work of the bureau along three broad lines. The engineering division handles the work of construction and of operation and maintenance. Another division has to do with the coordination of and bringing of system into our purchases and clerical administration, and with the difficult and important question of collecting money. Finally the somewhat nebulous division of farm economics will bring about the organization of the farmers, work out farm problems, build up a better spirit and more hope, and help them to work with better tools, to grow better crops, and to have a civic pride in their particular locality. That task is equally the prob-

lem of the State, as every project that fails is an injury to the State and community because it not only shows failure but tends to reflect upon the State's opportunities. In building up morale, a reputation for success, and a feeling that these projects are good places in which to live and that the Government's generosity in its terms of repayment has not been misplaced, we must have the cooperation of everybody in the State. We will thus be introducing teamwork entirely outside the project boundaries, growing out of the knowledge that the whole State will be benefited by changing the present situation into one where we are traveling on the upgrade.

These three divisions must not be water-tight compartments. The general demarcation of the lines of activity will leave many places where they will have to work together. In the beginning there is no doubt that some of the functions of one division will be performed by another; perhaps that will continue where it will prevent duplication and loss of efficiency.

In conclusion it should be a source of gratification and pride to the bureau that this rigid scrutiny by men high in business and professional work did not disclose the slightest taint of dishonesty or lack of zeal. Those of you who have read the report know that it contains a tribute to this honesty and zeal. In these days of "black gripsacks" and "Teapot Domes" it is a matter of pride and satisfaction to everybody that there was no suspicion of anything of that kind in the record of this bureau.



Turning the sod on a new homestead, Sun River project, Mont.

TURKEYS A VALUABLE CROP ON THE NEWLANDS PROJECT

The 1923 crop of 27,250 birds provided ready cash to pay taxes and operation and maintenance charges—Many flocks ran as high as 1,500 birds and were a major activity of some water users

THERE is perhaps no other livestock industry which yields such large returns in proportion to the initial investment as turkey growing, according to L. E. Cline, agriculturist on the Newlands irrigation project in Nevada. The short length of time required to produce and market the crop also makes the enterprise attractive in localities where climatic conditions and market facilities are favorable.

The 27,250 turkey crop on the Newlands project for 1923 was a very important cash crop. Although it was not considered a major activity for the project, it furnished a lot of ready cash to meet operation and maintenance charges and taxes, which fall due during the holiday season.

There is perhaps no other farming industry where the services of the rancher's family count for so much as in the growing of turkeys. In this connection, however, it must not be inferred that real skill and knowledge of handling turkeys from the brood stock to marketing the new crop is not essential. This is especially applicable where turkey growing is a major activity.

Good stock.—The beneficial results of good breeding stock are more readily apparent with turkey growing than with other livestock industries. These beneficial results are produced and cashed in within one short season. Early maturing and thrifty hens and gobblers are always retained by the most successful growers as a foundation for the next season's crop. Local experiences have shown that it is important to have the young turkeys ready for market as early as possible, so that they may be placed on the first attractive market available. The pre-Thanksgiving market, as was the case last year, is very often the best market, and it gives the grower a big advantage to get a part of his crop, at least, off his hands before the Thanksgiving rush comes. Early hatched and early maturing birds are always ready for the early market and are the most profitable. It is a common observation that late hatched turkeys and less thrifty ones in a large flock fare very poorly, and with small prospects for profitable returns.

Equipment.—Fortunately for the Newland's project as with most irrigation projects the almost rainless spring and summer months make it unnecessary to provide expensive shelter for turkey growing. Individual brooding coops with one compartment made to protect against stormy weather and predatory animals are placed along levees or in small alfalfa



More of the holiday birds should be grown on the irrigation projects

patches. This is the principal outlay for equipment. In order to handle large flocks conveniently, some have inclosed with woven wire a few acres of alfalfa, so that the young poults may be given close attention with the least labor. A roosting corral equipped with horizontal racks provides adequate accommodations for the maturing crop.

Blackhead control.—The control of blackhead disease in turkeys has received much attention among the growers of this project. In spite of heavy losses at times, the growers have persisted in their endeavors to overcome this greatest of all handicaps to the turkey industry; and the fact that it has been possible to increase the industry to such a great extent, after it was almost wiped out during a four-year period, shows to what extent the growers have been able to combat the disease. Constant vigilance has been the price of success. This vigilance has been in the form of strict attention to sanitation with medication playing a minor part. Intestinal antiseptics, such as sulphocarbolate compounds and bichloride of mercury 1 part to 10,000 parts water, used in the feed and drinking water have no doubt served to hold outbreaks in check. Recent investigations on the cause of blackhead in turkeys make the combatting of this disease much more hopeful in the future. It has been found that the ordinary intestinal worm common to all barnyard fowls must accompany the invading parasite to which has been attributed the blackhead disease before the disease will be produced. It is an easy matter to combat intestinal worms. The feeding of pulverized tobacco to turkeys to combat intestinal worms may be all

that is necessary to rid our turkey flocks of the cause of blackhead.

Feeds.—The feeding of turkeys is growing more simple and more profitable with local growers, especially after the young stock is able to range. Green alfalfa fields and insects help materially to keep down the cost of young birds and assist greatly in maintaining good health. The practice of growing such grain crops as wheat, millet, and corn and allowing the turkey crop to do the harvesting is becoming more general each year and greatly reduces the cost of production. The cheap cost of production must be kept in mind from the start.

Marketing.—The marketing of the turkey crop is one of the most important features and often the one not given adequate attention. There is perhaps no farm crop in which proper finish plays such an important part. In most cases the roasted turkey comes on the consumer's table uncarved, and it must be presentable. Turkeys are not considered so much a necessity, so far, as a luxury, and the grower should keep this in mind. Prime birds invariably sell well. Poorly finished stock brings disappointment to the grower and to the consumer.

The time of marketing and the most advantageous market must be studied carefully for each particular crop. Proximity to a big consuming center, such as the San Francisco bay district, has been one of the most valuable assets to the turkey grower of the Newlands project.

With the start that local growers have for the new year, turkey growing will no doubt be one of the big industries on the Newlands project for 1924.

NEXT GREAT DAIRY CENTER SHOULD BE IN THE WEST

Within the next few years the Pacific coast bids fair to be as thickly populated as the Atlantic coast—This prospective demand for dairy products must be met by development of the industry in the Western States

THE development of the dairy industry follows closely the westward march of civilization and settlement of the lands for agricultural purposes, in the opinion of J. L. Kraft, who has prepared the following article for the NEW RECLAMATION ERA.

The dairy cow has always traveled with the pioneer. She has made her place of abode wherever families have located for the building of individual homes or the development of cities. Where the product of the dairy cow has been largely consumed, there grew the sturdiest families and the best governed communities. Great centers of population have made essential greater numbers of dairy cows.

Not more than a half century ago the dairy industry was almost entirely confined to New York State. As population pushed its way westward, we find Ohio and Pennsylvania were producing large quantities of milk and dairy products. About 15 years ago the State of Wisconsin actually became the largest producer of dairy products, and this position she has held ever since.

Increased monetary values have invariably followed the advance of the dairy cow. Those States which have developed to the greatest possible degree in the dairy industry have prospered most.

There is a tremendous interest on the part of the farmers throughout the country in an increased production of milk. It has been shown conclusively that of all the products raised by the farmer dairy products have shown the most consistent profits since 1911. The United States Government has prepared a chart covering the period from 1912 to 1921, which shows that there has been an approximate profit to the farmer on cheeses of about 22 per cent and an approximate profit on butter of between 18 and 20 per cent covering that entire period, and at no time during the period was the farmer producing dairy products without a profit. I question whether this can be said of any other single item produced by the farmer.

Naturally this situation will have a tendency to increase the production in the regular dairy sections, but I am of the opinion that the production to be expected from those sections will not be ample to supply the demand.

Population on the Pacific coast is increasing by leaps and bounds. Within the next few years the Pacific coast bids fair to be almost as thickly populated as the Atlantic coast. It is predicted that the two great centers of population will

be at the eastern and western extremities of the continent.

LIVESTOCK ON FARMS KEEP SOIL FERTILE

A homestead which maintains a proper number of farm animals, and which feeds practically all of the field crops, sells off the land not only the most profitable manufactured product of the farm, but that which has cost least in actual plant fertility. The elements in the soil which make the soil fertile and enable crops to grow are present in a somewhat limited quantity, at least in an available form. These crops sold off the farm will soon reduce the quantity of easily available plant food to a degree that will reduce materially the acre yield. When the crops raised on the land are fed to animals, the manure of the animals may be returned to the land, and in that way the fertility taken from the soil is largely replaced, thus maintaining the fertility of the soil indefinitely. The experience of the older countries teaches this lesson forcefully.—Report of Committee of Special Advisers on Reclamation.

There are three elements of utmost importance which must be considered when wide plans are being made for developing the dairy industry. Any one of those three conditions may be overcome by artificial means or hard work on the part of the dairymen, but where those three conditions naturally exist you will find a section of the country that should be actively engaged in the production of dairy products. The inhabitants of that section of the country should be sold on the dairy idea. Not only the farmers but the townspeople and those in control of the business interests of that community should become interested to make dairying a success.

We have a striking illustration of the working out of a proposition of this sort in the great dairy drive inaugurated by Gov. D. W. Davis, of Idaho, about two years ago. Idaho had suffered severely in the declining markets of the products it was producing at that time. Those products were principally alfalfa and potatoes. Both of those products were bulky and carried a very high freight rate; and the markets for them were far removed from the lands upon which they were produced. It was found impossible to pro-

duce them at prices which could be paid when the freight rates were taken into consideration. The State of Idaho, therefore, was face to face with a financial crisis.

Governor Davis sensed the situation and decided that Idaho possessed the three cardinal elements, namely, soil, water, and climate, which would make it a great dairying State. In the working out of his plan, which has since become famous, Governor Davis invited prominent dairymen from all over the United States to visit Idaho. He furnished a private car which conveyed these dairymen from Omaha to Idaho and then throughout the State. Conditions were found to be so ideal that every member of the party was thoroughly convinced that Idaho was as near the perfection of conditions as it was possible to obtain for the dairy industry. Such an impetus was given to the movement by reason of this visit that Idaho has made tremendous progress in the meantime.

I have not the completed figures available as to just what progress has been made in the past two years, but I do know that in the neighborhood of 65 new cheese factories have been established and are operating successfully and that a number of new creameries have been put into operation; and that those cheese factories and creameries which were established prior to the governor's activities in the dairy line are to-day working to capacity, whereas before that they were nearly all on the verge of closing up. Good prices have prevailed and Idaho is now on her way to become a strong competitor of the eastern dairy sections.

Idaho is not the only State to have profited by the extra impetus given through the plans made within the past two years. The Bitter Root Valley of Montana has come to the fore rapidly and is to-day producing considerable quantities of fine creamery butter, American cheese, and Swiss cheese. One cheese factory in the Bitter Root Valley which was closed two years ago is to-day operating with two shifts of cheesemakers.

Certain it is that the United States will increase in population to a greater degree than any other country in the world within the next decade. This thought is based upon all the conditions and indications prevailing in the United States to-day and having to do with the natural advantages in the United States, the Governmental advantages, and its desirability from the standpoint of immigration. It is safe, therefore, to assume that the dairy industry can look forward to a long period of prosperity.



The sugar-beet industry on the Strawberry Valley project, Utah
Upper: Front view of sugar factory at Spanish Fork
Lower: Beet sheds at the Payson factory

SUGAR BEETS ON THE STRAWBERRY VALLEY PROJECT

Remarkable growth of the sugar-beet industry on the project outlined. Nearly \$400,000 paid annually on the project for labor and about \$1,000,000 annually for beets

TO THE people of Utah belongs the distinction of being not only pioneers in exploring and settling the intermountain country, but also in establishing the sugar industry therein on irrigated lands. The history of the industry in that State runs back to 1852 when the Mormon Church brought machinery to Utah from France for the purpose of making sugar. This machinery was hauled across the plains by ox teams at a time when the cost of hauling freight from Missouri River to Salt Lake City was \$500 per ton.

The people at that time failed in their efforts to produce sugar from beets, although for a year or two some molasses was produced. A mill was established at Spanish Fork in about 1886 or 1887 to produce sugar from sorghum cane. Sufficient brown sugar was made to secure a territorial bounty; otherwise that enterprise was also a failure. Attention was then turned to beets and resulted in the investigation and formation of a beet-sugar company.

Growing sugar beets was a new proposition and for the first two or three years the average yield per acre did not exceed 5 or 6 tons, as compared with 12 to 15 tons at present.

The original beet sheds were covered, and once when more beets came in than the sheds could hold they were piled in the open. Great anxiety was felt, however, lest they freeze. To prevent this from happening, a large gang of men was put to work cutting rushes along the Jordan River. These were woven into a huge mat and thrown over the pile of beets to protect them from the cold. Large quantities are now piled for weeks in the open each year without fear of deterioration.

When the Lehi factory was built the Federal Government was offering a bonus of 2 cents a pound for all sugar produced in the United States, and the Territory of Utah also a bonus of 1 cent a pound for all sugar made in Utah. Notwithstanding these inducements, the first two years' operations at the Lehi factory were a decided failure, except as a matter of education. The first year's production was only 10,948 bags of sugar; the second year about 15,000 bags were produced, as the beets averaged only 77 per cent purity with 10 per cent sugar content. About this time, however, the people began to realize that this new industry was a good thing for the community, and the third year the output was 41,000 bags. Seven

years elapsed, however, before another factory was built in Ogden, in 1898, and five years more, in 1903, before the first factory was erected in Idaho near Idaho Falls. From these small beginnings production of sugar has grown until it is now one of the most important factors in the West.

Nevertheless, the crying need, economically, of the industry in Utah and Idaho is more beets and still more beets. The 27 factories now built and in operation could easily handle 2,500,000 tons of sugar beets in 90 days, from which would be produced 6,250,000 bags of beet sugar.

If sufficient beets were grown for the present factories, Utah and Idaho alone could furnish 30 per cent of the country's crop of beet sugar.

The erection in 1906 of an auxiliary plant or cutting station at Spanish Fork, Utah, with only 1,900 acres of beets to support its operation, marks the beginning of the real paying operations of the sugar beet industry on the Strawberry Valley project. There were 20,000 tons of beets cut the first year at that station, the juice from which was transmitted 30 miles by pipe line to another factory at Lehi. This figure increased shortly to an annual production of 40,000 tons from about 3,800 acres. In 1914, when it was practically assured that irrigation water from the Strawberry Valley project would be available for beet production, the Utah-Idaho Sugar Company took active steps to build a 600-ton factory at Payson and two years later erected another factory at Spanish Fork with a daily capacity of 1,000 tons. About two years later an independent sugar company was formed and

erected a factory at Springville with a capacity of 500 tons. These three factories are supported by beets grown on project lands. Since the completion of these three factories, the average area planted has been 14,000 acres and the average tonnage of beets paid for annually is very close to 150,000. The lowest price paid to the farmers was \$5 per ton and the highest price \$12. Although a considerable amount of this crop is grown on lands having no project water, still the presence of loading, hauling, and planting facilities which is a sequel to the advent of the project, together with the benefits derived from the project water, have caused the production of beets to increase at least threefold.

Nearly \$400,000 are paid out annually on the project by the sugar companies for labor, a large part of which is earned by local farmers at the close of the irrigation season.

The by-products from the factories are available to beet growers for feeding and fattening sheep and cattle. It has been found that a steer may be fattened in 70 to 90 days by feeding daily 100 pounds of pulp, 6 pounds of molasses, and 4 pounds of wheat or barley; that sheep are fattened in from 45 to 60 days by feeding 10 pounds of pulp and 1 pound of grain; it being assumed that as well as these quantities of pulp and molasses the sheep and cattle receive as much alfalfa as can be consumed. All the pulp produced at the factories is readily disposed of and the beet growers are charged only an average price of 65 cents per ton for the pulp and \$7 to \$10 per ton for molasses.

With such conditions as described above prevailing on the Strawberry Valley project, it is possible for a farmer to grow his crop of beets during the summer time, to work at one of the factories during the fall and early winter, or to feed stock with the by-products to which he is entitled from the sugar factories at low cost.

During the past few years a cooperative method of framing contracts between the sugar companies and beet growers has been the usual method of determining the price paid for beets. Both the companies and the growers are attempting to frame these contracts in such a way that the price of sugar throughout the year and the average sugar content in the beet shall be factors in determining the final price paid.

SPLENDID DAIRIES AID NEWLANDS YOUNGSTERS

The recent United States survey of Nevada from a child standpoint showed that the children of Fallon, on the Newlands project, are nearer a standard weight and are better nourished than those of any other section of the State, according to Dr. Edith B. Lowry, of the United States Public Health Service, as reported in a local paper.

The well-fed condition of the youngsters on the Newlands project is attributed by Doctor Lowry to the splendid dairies that abound in that locality, as well as the liberal quantities of vegetables grown there.

WATER USERS LAUD RECENT REPORT

REPRESENTATIVES of all the irrigation districts on the Yakima project, Washington, have indorsed the recent report of the Committee of Special Advisers on Reclamation to the Secretary of the Interior, through the following resolutions sent to President Coolidge:

PRESIDENT CALVIN COOLIDGE,
Washington, D. C.

We heartily approve the report of the fact finding commission and believe that if necessary legislation is enacted to carry out the spirit of these recommendations, that under the able supervision of Doctor Mead, many of the problems of reclamation will be solved.

Especially do we indorse the recommendation, as we interpret it, in the report that provision be made by the Reclamation Service to retire bonds issued by districts in this valley to complete the construction of the distribution and drainage systems.

We assume the 5 per cent of gross production as basis of payment should not be so interpreted or applied as to work hardship as in case of formerly profitable fruit crops now largely resulting in a net loss or a very small margin of profit.

We especially approve report in recommending that money in reclamation fund

be loaned to needy farmers to purchase livestock and equipment so that they may engage in diversified farming, rather than use this money in building new projects.

We indorse the principle of investigation of the markets and of the necessity of additional production by the Secretary of Agriculture before beginning new projects.

We believe the starting of new projects in this valley at this time in midst of present serious agricultural overproduction and depression would be ill-advised.

Unanimously adopted at a meeting of the officials of all the irrigation districts in the Yakima project, at Sunnyside, Wash., April 16, 1924.

(Signed: W. L. Barker, president, Sunnyside Valley Irrigation District; J. W. Shockley, president, Outlook Irrigation District; O. G. Patch, president, Snipes Mountain Irrigation District; W. I. Huxtable, vice president, Tieton Water Users Association; E. V. Heater, president, Grandview Irrigation District; H. M. Rowan, president, Prosser Irrigation District; J. J. Fraser, president, Sunnyside Irrigation District; C. P. Wickersham, president, Yakima County Farm Bureau; George P. Eaton, vice president, Granger Irrigation District.)—*From Sunnyside (Wash.) Sun, April 10, 1924.*

WOMAN'S PART IN THE WORK OF RECLAMATION

Woman's part in conquering the desert is usually underestimated. The experience of agricultural settlements is that if the women fail to cooperate with the men the desired results in settlement may not be achieved. For that reason educational propaganda in behalf of training of women for rural life has been well received by all thinkers on the subject. The rural-minded man must have a rural-minded wife if the two are to succeed in the building of a household on the land. If a man lives the life of a farmer and a woman longs for the life of the city, sooner or later economic disaster will overwhelm the two and they will not add permanently to the conquest of the desert. With this thought in mind it is interesting to find that women's clubs and organizations are plentiful on most of the projects. The project women not only consider matters of art, literature, history, science, and other subjects that help keep them in touch with the progress of the world, but they also give themselves frequently to a systematic consideration of the special problems that confront them as builders of a commonwealth. A very wholesome and patriotic spirit pervades the activities of women on the projects. This contributes in no small degree to social contentment.—*Report of Committee of Special Advisers on Reclamation.*

EXCESS LAND OWNERSHIP SHOULD BE DISCOURAGED

One of the witnesses at Salt Lake who was asking for relief admitted the ownership of 320 acres and the leasing of an additional homestead area. He was cultivating three times the acreage he was permitted to have under the act. Another, who appeared to ask for postponement of payments, admitted the ownership of several farms within a single project. Another admitted the ownership of 1,200 acres, where 160 is the maximum for a farm. It is evident that the act needs to be amended either by the repeal of the limitation to a single homestead, or by putting teeth in it which will enable it to be enforced. This ownership of surplus land should be taken into account in granting relief. The claim for relief made by a settler living on and cultivating his homestead is more entitled to consideration than the claim of the owner of several farm units, or that of the nonresident owner whose land is cultivated by tenants.—*Report of Committee of Special Advisers on Reclamation.*



Almonds are a large and profitable crop on the Orland project, Calif. Here the nuts are being dried in trays

CROP CONDITIONS ON THE PROJECTS

THE following is a brief of summary crop conditions on the irrigation projects of the Bureau of Reclamation, Department of the Interior, at the end of April:

Yuma project, Arizona-California.—Alfalfa was cut as early as possible and baled quickly to take advantage of the high prices. This may lessen the seed crop. Cotton growth was retarded by the cool weather.

Orland project, California.—The first crop of alfalfa harvested showed a light yield owing to cool weather. Orchards continued to make favorable growth.

Grand Valley project, Colorado.—The first irrigation of alfalfa was being completed at the end of the month and the crop was making excellent growth. The acreage planted to sugar beets is the largest in the history of the project. Very little grain was planted. Prospects were excellent for nearly a full crop of apples, peaches, and pears, as the fruit crop was damaged only slightly by frost.

Uncompahgre project, Colorado.—Movement of the potato crop to market was completed. The price of good seed potatoes increased during the month from \$1 per hundredweight to \$1.50. Weather conditions delayed farm operations. Indications pointed to a considerable increase in the acreage of onions and sugar beets and a corresponding decrease in the potato acreage.

Boise project, Idaho.—Practically all crops had been seeded. Prospects were excellent for a large first cutting of alfalfa. Netted Gem potatoes stored during the winter were in demand at \$1.80 to \$2 per hundredweight f. o. b. cars.

King Hill project, Idaho.—Late frosts damaged the few peaches and apricots, but the apple crop was promising.

Minidoka project, Idaho.—More than 15,000 acres of sugar beets were signed up for the Burley and Paul factories, and it was anticipated that the total beet area for project factories would amount to 17,000 acres. The area planted to potatoes will probably be considerably less than last year. The reduction in the grain acreage will be offset by an increase in the acreages of peas and beans.

Huntley project, Montana.—Winter wheat was in fine condition, and spring seeding was going ahead rapidly, with soil conditions generally very favorable for preparation of the ground and planting.



Just a field of irrigated spuds on the Yakima project, Wash.

Milk River project, Montana.—About 550 acres will be planted to sugar beets, and the acreage in corn will be largely increased.

Sun River project, Montana.—Assurance was given to prospective sugar-beet growers that satisfactory arrangements would be made to secure hand labor, and growers were advised to make plans to put in as large an acreage of beets as possible.

Lower Yellowstone project, Montana-North Dakota.—Spring seeding was in full swing, and a larger acreage of corn and sugar beets will be planted than ever before. The sugar company reported 6,500 acres signed up for beets, and a seed company had put out seed for 300 acres of peas.

North Platte project, Nebraska-Wyoming.—Planting of crops was somewhat retarded by weather conditions, although practically all the beet acreage had been planted.

Newlands project, Nevada.—Practically no potatoes were being planted in the Truckee division, but farmers were putting in the usual cantaloupe acreage. Frost caused some damage to fruit and early vegetables.

Carlsbad project, New Mexico.—Good progress was made in planting the cotton crop. The first crop of alfalfa was damaged by a heavy frost on April 17.

Rio Grande project, New Mexico-Texas.—The greater portion of the cotton acreage was planted during the latter half of the month. The pear crop looked promising. The increase in the irrigated

area of the project will probably amount to 20,000 acres, much of which was being put in first-class condition for irrigation.

Umatilla project, Oregon.—Heavy damage was done to the fruit buds by severe late frosts; and peaches, apples, cherries,

and pears were almost totally destroyed. The first crop of alfalfa was held back by the cold weather.

Klamath project, Oregon-California.—Crops generally were doing well. Prospects were good for a large grain crop on the Tule Lake leased lands.

Belle Fourche project, South Dakota.—Indications pointed to an increase in the corn and sugar-beet acreages at the expense of alfalfa. Oat seeding was in progress.

Strawberry Valley project, Utah.—Condition of alfalfa and fruit was excellent. Owing to the extremely dry weather it was necessary in many cases to irrigate and resow sugar beets.

Okanogan project, Washington.—Extreme cold weather on April 15 and 25 did considerable damage to apple buds and blossoms, discounting the very large crop anticipated early in the month.

Yakima project, Washington.—Apples were being cleaned up from storage. Potatoes were selling at a good price, ranging from \$40 to \$55 per ton. The usual spring work was in progress. Frost caused considerable damage to the fruit crop on the Sunnyside division; and it was estimated that there will be a 50 per cent peach and pear crop, a 40 per cent cherry and prune crop, and a 75 per cent apple crop.

Shoshone project, Wyoming.—Cold weather retarded farm work and little planting had been done. About 2,000 acres will be planted to potatoes and 2,500 acres to sugar beets, an increase in the latter acreage of about 22 per cent.

IRRIGATION LAW DECISIONS

UNDER a contract relieving an irrigation company in Colorado from liability to its grantee for damages "on account of seepage or backwater from" its reservoir, damage caused by the waters of the creek being backed up by those of the reservoir so that sand and silt were deposited in the creek, causing it to overflow, is damage "on account of backwater" from the reservoir. By reason of the terms of the contract no recovery can be obtained for such damage. Among other arguments made by the plaintiff in this case was the argument that it is against public policy for a corporation to contract against the result of its own negligence. The court held, however, that although the rule cited in the plaintiff's argument is applicable to public service corporations, it is not applicable to a contract by an irrigation company against liability to its grantee for damage from seepage or backwater. The court further held that when one seeking to enjoin obstruction of a creek and to recover damages from prior obstruction is not entitled, because of the terms of a contract into which he has entered, to recover any damages, he is not entitled to an injunction against further obstruction, since if such an injunction was warranted a recovery for past obstruction would also be warranted. (*Webster v. North Poudre Irrigation Co. (Colo.)*, 223 Pac. 36.)

In recent litigation in which it was sought to enjoin steps looking to the construction by an electrical district in Arizona of a transmission line to furnish power to pump water for irrigation purposes, it was urged that the furnishing of electric power to owners of arid land for the pumping of water for the irrigation of such lands is a private business and not one which an electrical district can lawfully operate. The supreme court of Arizona held, however, that since the object and purpose for which the power was to be used was a public purpose, to wit, to make available for irrigation of large areas of arid lands underground water that could not otherwise be used or applied to the said lands, the said contention could not be sustained. (*Brown v. Electrical Dist. No. 2, Pinal County, et al. (Ariz.)*, 223 Pac. 1068.)

If, by virtue of stock in a corporation, one has an interest in a particular ditch, and the right to have water carried through it, he has a right to compel the

company to carry the water through that ditch. If, on the other hand, however, the stockholder has merely the right to compel the company to deliver so much water at a given place, he has no right to compel the company to deliver the water through a particular ditch; but it suffices if the delivery is made in sufficient amount, and without injury, inconvenience, or additional expense. (*Dukes v. Canyon Hill Ditch Co. (Idaho)*, 224 Pac. 85.)

A regulation by a city owning and operating its own electric plant requiring the payment of a penalty on the part of individual consumers for failure to pay electric bills within a specified time is not effective to modify the terms of a contract between such city and the Federal Government for furnishing electric current at specified rates and containing no provision for such penalty. (3 Compt. Dec. 427.)

When a Carey Act construction company contracts to deliver a certain quantity of irrigation water per acre to a settler and contract holder and it develops that it can not deliver that amount of water out of the appropriation made by it at the time the contract was made, it can be compelled to deliver him the required amount of water out of a later appropriation, if the same is not required to satisfy prior rights of other water users. (*Vinyard et al. v. North Side Canal Co., Ltd. (Idaho)*, 223 Pac. 1072.)

The Sussex Land & Live Stock Company owns lands upon Salt Creek in Wyoming, located below the point where the Midwest Refining Company is engaged in drilling and operating oil wells. The stock company sought to enjoin the oil company from discharging oil into the stream. The trial court found that the oil company had used and was using every known method and device to prevent the loss of oil, but that such loss did occur to the damage of the stock company; that the injury was not permanent but had occurred for five years and probably would continue during the life of the oil field; that a large industry was dependent upon the continuance of the oil company's operations; that injunction should not issue but damages should be awarded; and that, on the evidence presented, the measure of damages was the rental value of the damaged lands. The decree of the court awarded damages for past injuries, and fixed the annual charges to

apply during the continuance of the trespass, denied the injunction, and retained jurisdiction for the purpose of controlling payments for future trespasses. The stock company appealed because the court refused the injunction requested and applied the "rental value" as the measure of damages; and the oil company cross appealed on the ground that the stock company had not been legally injured. The Circuit Court of Appeals affirmed the decree of the lower court, and pointed out that it is unlawful for one owner to invade physically the land of another owner, as the oil company here in effect did when the oil was carried down the stream and deposited on the stock company's land to the partial damage of that land in its natural usage. As to the pollution of the water, which made it unfit for drinking purposes, the court ruled, citing the case of *Arizona Copper Co. v. Gillespie* (230 U. S. 46, 57), that a priority of right in water, such as the stock company had in the water of the stream under the Wyoming laws, includes the quality as well as the quantity, and that it was no defense that the cause of the pollution was a natural user of the land in a careful manner. (*Sussex Land & Live Stock Co. v. Midwest Refining Co. (Wyo.)*, 294 Fed. 597.)

Section 7230, Oregon laws, provides that "Communities may be incorporated as municipal corporations for the purpose of supplying their inhabitants with water for domestic purposes as in this act hereinafter provided." The term "community" as used in this law, should be construed to embrace and include all the inhabitants of a district having a community of interest in obtaining for themselves in common a water supply for domestic use, and such a district can not include lands abundantly supplied by springs with good water. Any other construction of the law would be violative of the due-process-of-law clause of the Federal Constitution. (*Hamilton v. Rudeen, County Com'r. (Ore.)*, 224 Pac. 92.)

Section 4362 of the Compiled Statutes of Idaho provides that irrigation districts must make assessments for benefits in accordance with the benefits which will accrue to each tract or subdivision from the construction of the works. Under this law an irrigation district has no right to assess the cost of a drainage system to lands regardless of whether or not such lands are benefited by the drainage system. Moreover, it is well settled that an assessment can not be based upon speculative future benefits, but must be based upon a present benefit immediately accruing or demonstrably certain to accrue from the construction of the works. (*Nampa and Meridian Irrigation District v. Petrie et al. (Idaho)*, 223 Pac. 531.)

PROJECT FINANCIAL STATISTICS

OCCASIONAL complaints reach the Bureau of Reclamation to the effect that a water user has not been able to obtain information concerning the financial status of his project, the cost of certain work, the amount due and unpaid by the water users, etc.

It is and has been the policy of the bureau to keep the responsible organizations of water users on the projects fully advised as to financial matters of this character and there should be no difficulty in securing all such information by following the proper procedure.

This matter was fully covered in an order by the Secretary of the Interior of November 15, 1909, which provided that—

"A water users' association, an irrigation district, or any individual having an interest in the lands included in a reclamation project desiring information from the fiscal records of a field office of the bureau should—

"(a) File application in writing with the project manager, stating what interest the applicant has in the project and the nature of the information desired.

"(b) The project manager, if satisfied that the giving of such information will

not be detrimental to the public service, will indorse on such application his approval, whereupon the information sought will be promptly supplied and a record

IMPORTANCE OF HUMUS

Growers do not fully realize what an important factor humus is in the soil, especially in arid and semiarid regions where there are long periods between irrigations.

Moisture is the lifeblood of the plant, and if the soil can be brought into such a condition that the moisture is retained, the soil will be much more fertile and the irrigations applied could be lighter. This being the case, the danger of seepage is lessened, as with lighter irrigations there will be less likelihood of water-logging the soil.

The following figures will perhaps help to convince growers of the advantage of adding humus to the soil:

100 pounds of sand can hold 25 pounds of water.

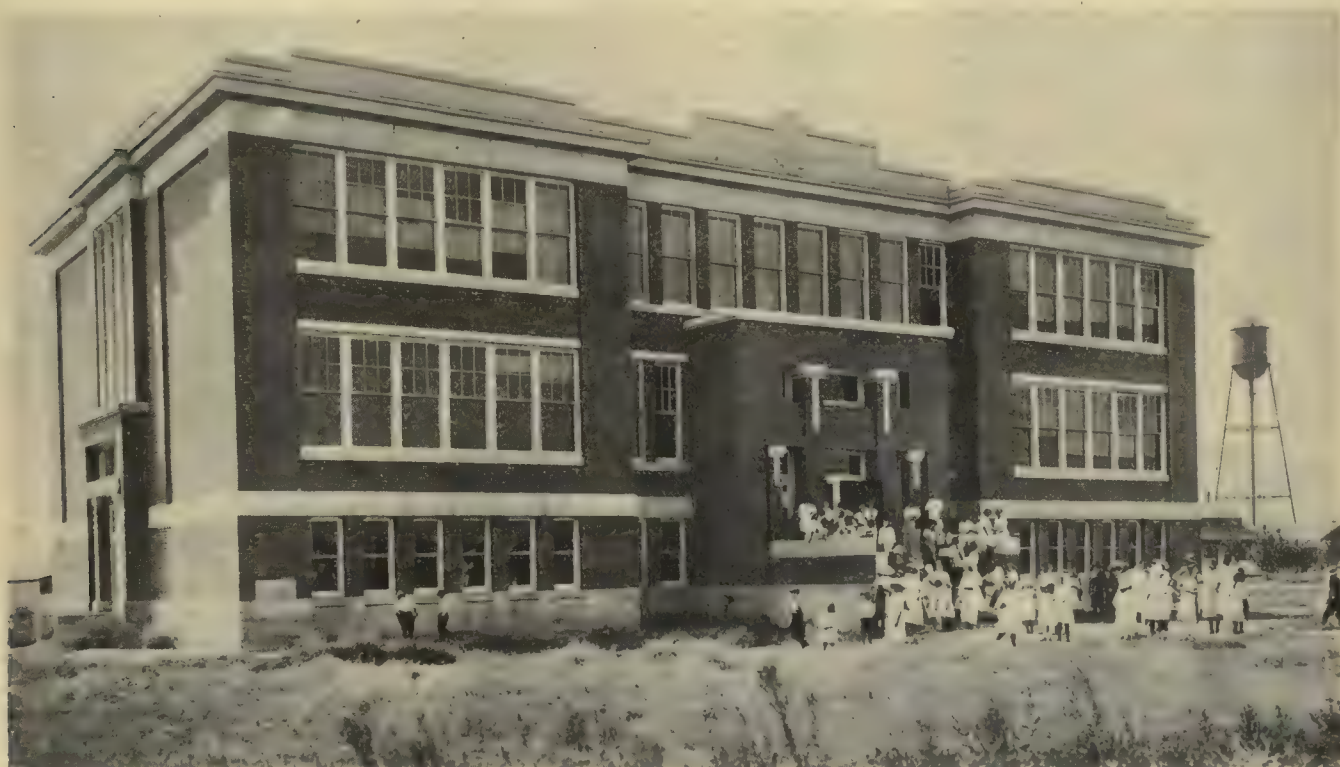
100 pounds of humus can hold 190 pounds of water.—Fruit World of Australasia.

made thereof. If the application be denied, the project manager will indorse the reasons for disallowance thereupon and promptly forward the same to the chief of construction, who will forward it to the director for transmission to the Secretary of the Interior in case of appeal.

"(c) When application is received for information which will require undue labor and expense, an estimate of such expense should be made and the applicant required to deposit the amount before the work is undertaken."

Under the new organization of the bureau, which places the fiscal affairs under the jurisdiction of the Director of Finance, information of the character described will hereafter be furnished by the respective chief clerks. It is believed that better results can be obtained by working through the project water users' organizations, which will be furnished all available fiscal data on request. Individual water users interested in the subject can doubtless secure the information desired from the officials of these organizations.

Every project organization has a right to know the financial status of its project. The disbursements, distribution of costs, available funds, amount of collections and delinquencies, and similar data are matters of concern to all project farmers, and it will be the definite aim of the Bureau of Reclamation to furnish such information when desired.



June marks the graduation of hundreds of sturdy young Americans from the project seats of learning

PURCHASE DISCOUNTS ASSIST WATER USERS

R. L. Carmichael, Special Assistant to the Chief Coordinator, has sent to the Chief Coordinator of the Government a memorandum on the subject of discounts in the Department of the Interior, containing the following concerning the practice followed in the Bureau of Reclamation:

"Local procurements and disbursements are made at each reclamation project, and a central procuring and disbursing office is maintained at Denver for handling larger items of procurement. Discounts are invited and a record of amounts taken is kept. No loss of discounts was noted. The records show \$134,592.31 in discounts taken since 1913 and \$30,448.45 in the fiscal year 1923.

"This very creditable record indicates a realization of the benefits to be derived from prompt payment of bills and that an effort is being made to obtain them for the Government. Practically all bills are paid in less than 30 days, most of them in less than 10 days. It was stated that much benefit to the Government has resulted from prompt payments, in better prices, and better service through increased competition, not reflected in the amounts received as discounts."

The figures given by Mr. Carmichael refer only to the main purchasing office of the bureau at Denver. In addition purchases aggregating a considerable amount, probably several times as much as the Denver purchases, although in much smaller amount at any one point, are

STUDY OF ALL FACTORS NECESSARY TO SUCCESS

The Bureau of Reclamation and those associated with it should give themselves to a complete and detailed study of all the factors concerned in agricultural production and marketing. This would involve surveys of soils and agricultural systems, of marketing conditions, and of all other things of concern to the farmer. Such efforts would soon lead to an increased financial prosperity on the Federal irrigation projects. Whatever measures Congress may adopt to make successful the splendid experiment of the American Government in the reclamation of its arid and semiarid lands by irrigation will be largely fruitless unless it is possible for the farmer, with the application of reasonable energy and intelligence, to win from his farm a sufficient income to meet such obligations as he has incurred or which of necessity will appear from year to year. This is perhaps the first duty of the Bureau of Reclamation.—Report of Committee of Special Advisers on Reclamation.

made on the various reclamation projects of the bureau. Also some small purchasing is done at Washington, D. C., and large matters are handled there. For the fiscal year 1923 the records show the following discounts secured:

Denver office.....	\$30,448.45
Washington office.....	45,184.00
	75,632.45

TULE LAKE SURVEY ORDERED COMPLETED

Completion of the survey of the bed of Rhett or Tule Lake in northern California by Government surveyors of the General Land Office has been ordered.

Tule Lake Valley and the lake itself are a part of the Klamath reclamation project in Oregon and California. When the project was constructed, Lost River, which furnished the water for Tule Lake, was diverted by a canal and became an affluent of the Klamath River. The result was that the lake was deprived of its inflow of water and has gradually receded.

The bed of Tule Lake, situated in Oregon, was surveyed in 1917, and since that year surveys from time to time have been made of considerable areas of land once a part of the lake in California, but have never been completed because a part of the bed was still covered with water. The special instructions recently issued provide that Government surveyors continue the work until finished.

The water has not entirely disappeared from the lake bed, but what remains is generally shallow, and the instructions provide for the extension of the lines of survey over and through the water unless the depth is found to be such as to prevent such procedure. This condition is not indicated by the contour maps of the Bureau of Reclamation. Long, wooden post corners will be set in place of the regulation iron monuments where the water is too deep to permit the use of the latter in the customary way.

Rhett Lake appears to be the official designation of this former body of water; Tule Lake is the popular name. It also has another name appearing in the older references to this lake, "Modoc Lake," and from an historical viewpoint it is unfortunate that it is not the latter name which is perpetuated, for this region, in the early pioneer days, was the habitat of this fierce and unruly tribe of Indians. On the eastern side of the lake is a place still known as "Bloody Point," where a wagon train of emigrants was massacred. The marauding band later was chased back to their strongholds in the Lava Beds by a party led by the Applegates, a remarkable pioneer family who have left their impress in all of the Pacific States. On the south side of the lake are situated the historical Lava Beds, where Captain Jack with his little band in the last Modoc War made so stubborn a resistance to the besieging force of soldiers, and was finally driven out and captured only with the aid of Indians from the Warm Springs tribe brought there for that purpose.



Pure-bred cows mean larger cream checks for the up-to-date dairy farmer

ADMINISTRATIVE ORGANIZATION OF THE BUREAU OF RECLAMATION

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John H. Edwards, Solicitor for the Interior Department; E. K. Burlew, Administrative Assistant to the Secretary; J. H. McNeely, Assistant to the Secretary;
John Harvey, Chief Clerk

Washington, D. C.

Elwood Mead, Commissioner, Bureau of Reclamation
Ottamar Hamele, Chief Counsel; J. B. Beadle, Chief Clerk; C. A. Bissell, Engineer.

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R. M. Patrick and Armand Offutt, District Counsel
W. F. Kubach and W. A. Meyer, Fiscal Inspectors

Project	Office	Superintendent	Chief clerk	Fiscal agent	District counsel	
					Name	Office
Belle Fourche.....	Newell, S. Dak.....	F. C. Youngblutt.....	R. C. Walber.....		Brooks Fullerton.....	Mitchell, Nebr.
Boise.....	Boise, Idaho.....	J. B. Bond.....	E. R. Mills.....	C. F. Weinkauf.....	B. E. Stoutemyer.....	Boise, Idaho.
Carlsbad.....	Carlsbad, N. Mex.....	L. E. Foster.....	V. L. Minter.....	V. L. Minter.....	J. N. Beardslee.....	El Paso, Tex.
Grand Valley.....	Grand Junction, Colo.....	S. O. Harper.....	W. J. Chiesman.....	C. E. Brodie.....	J. R. Alexander.....	Montrose, Colo.
Huntley.....	Ballantine, Mont.....	A. R. McGinness.....	J. P. Siebeneicher.....	Miss M. C. Simek.....	E. E. Roddis.....	Helena, Mont.
King Hill.....	King Hill, Idaho.....	G. H. Harris.....	E. V. Hillius.....	E. V. Hillius.....	B. E. Stoutemyer.....	Boise, Idaho.
Klamath.....	Klamath Falls, Oreg.....	H. D. Newell.....	N. G. Wheeler.....	G. R. Barnhart.....		
Lower Yellowstone.....	Savage, Mont.....	H. A. Parker.....	E. R. Schepplmann.....		E. E. Roddis.....	Helena, Mont.
Milk River.....	Malta, Mont.....	G. E. Stratton.....	E. E. Chabot.....	J. T. M. Culbertson.....	do.....	Do.
Minidoka.....	Burley, Idaho.....	E. B. Darlington.....	E. C. Diehl.....	Miss A. J. Larson.....	B. E. Stoutemyer.....	Boise, Idaho.
Newlands.....	Fallon, Nev.....	J. F. Richardson.....	G. B. Snow.....	Miss E. M. Simmonds.....	P. W. Dent.....	San Francisco, Calif.
North Platte.....	Mitchell, Nebr.....	Andrew Weiss.....	L. H. Mong.....	V. E. Hubbell.....	Brooks Fullerton.....	Mitchell, Nebr.
Okanogan.....	Okanogan, Wash.....	Calvin Casteel.....	W. D. Funk.....	W. D. Funk.....		
Orland.....	Orland, Calif.....	R. C. E. Weber.....	C. H. Lillingston.....	C. H. Lillingston.....	P. W. Dent.....	San Francisco, Calif.
Rio Grande.....	El Paso, Tex.....	L. M. Lawson.....	C. A. Peavey.....	L. S. Kennicott.....	J. N. Beardslee.....	El Paso, Tex.
Riverton.....	Riverton, Wyo.....	H. D. Comstock.....	R. B. Smith.....	Henry Berryhill.....	Brooks Fullerton.....	Mitchell, Nebr.
Salt River ¹	Phoenix, Ariz.....	C. C. Cragin ²				
Shoshone.....	Powell, Wyo.....	I. B. Hosig (acting).....	W. F. Sha.....	Mrs. O. C. Knights.....	E. E. Roddis.....	Helena, Mont.
Strawberry Valley.....	Provo, Utah.....	W. L. Whittemore.....	H. R. Pasewalk.....	W. C. Berger.....	J. R. Alexander.....	Montrose, Colo.
Sun River.....	Great Falls, Mont.....	G. O. Sanford.....	H. W. Johnson.....	F. C. Lewis.....	E. E. Roddis.....	Helena, Mont.
Umatilla.....	Hermiston, Oreg.....	H. M. Schilling.....	G. C. Patterson.....	Miss M. G. Valentine.....		
Uncompahgre.....	Montrose, Colo.....	L. J. Foster.....	G. H. Bolt.....	F. D. Helm.....	J. R. Alexander.....	Montrose, Colo.
Williston.....	Williston, N. Dak.....	W. S. Arthur.....	W. S. Arthur.....	H. C. Melaas.....	E. E. Roddis.....	Helena, Mont.
Yakima.....	Yakima, Wash.....	J. L. Lytel.....	R. K. Cunningham.....	J. C. Gawler.....		
Yuma.....	Yuma, Ariz.....	P. J. Preston.....	C. A. Denman.....	E. M. Philebaum.....	P. W. Dent.....	San Francisco, Calif.

Large Works Under Construction

Boise, Black Canyon Dam.....	Emmett, Idaho.....	Walter Ward ³	M. J. Gorman.....	T. W. Hause.....	B. E. Stoutemyer.....	Boise, Idaho.
Minidoka, American Falls.....	American Falls, Idaho.....	F. A. Banks ⁴	H. N. Bickel.....	O. L. Adamson.....	do.....	Do.
Umatilla, McKay Dam.....	McKay Dam, Oreg.....	R. M. Conner ⁴	C. B. Funk.....	W. S. Gillogly.....		
Yakima, Tieton Dam.....	Rimrock, Wash.....	F. T. Crowe ³	V. G. Evans.....	C. F. Williams.....		

¹ Project operated by Salt River Valley Water Users' Association.

² General Superintendent and Chief Engineer.
³ Construction Engineer

⁴ Engineer in Charge
⁵ Superintendent of Construction.

The NEW RECLAMATION ERA is issued every month by the Bureau of Reclamation of the Department of the Interior, Washington, D. C. It is printed by the Government Printing Office, Washington, D. C.

The NEW RECLAMATION ERA is sent regularly to all water users on the reclamation projects under the jurisdiction of the bureau who wish to receive the magazine. To other than water users the subscription price is 75 cents per year, payable in advance. Subscriptions should be sent to the Chief Clerk, Bureau of Reclamation, Washington, D. C., and remittance in the form of postal money order or New York draft should be made payable to the Chief Disbursing Clerk, Department of the Interior. Postage stamps are not acceptable in payment of subscription.

IN FIXING THE ANNUAL WATER CHARGE the Government should determine what portion of the annual gross income should properly be allotted to other necessary annual charges. The policy heretofore followed—that is, failing to insist upon payments and granting relief from payment of water charges—has resulted in making the Government shoulder any deficit between gross income and gross annual expense. Settlers have grown to believe that water charges are the last of annual charges to be paid, and they attribute their financial failures to the amount of the water charges. This is not true. The water charges are in most cases the smallest of all annual charges. The use of water is the basis of earning power and hence should be first paid. If instead of an arbitrary amount determined by dividing the total construction cost by a fixed number of years, we require the payment of a certain per cent of average gross income, we place repayments upon a sound business principle, and the settler pays regularly for that which makes income possible. If he farms intelligently, he increases his gross income, thereby making it easier to meet all his obligations and more quickly completes his total payment to the Government.

—REPORT OF COMMITTEE OF
SPECIAL ADVISERS ON RECLAMATION

V. 15, No. 7

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NEW

RECLAMATION ERA

VOL. 15

JULY, 1924

NO. 7



SUN RIVER DIVERSION DAM, SUN RIVER IRRIGATION PROJECT, MONTANA

*"AN old man, going a lone highway,
Came at evening, cold and gray,
To a chasm vast, and deep, and wide.
The old man crossed in the twilight dim;
The sullen stream had no fear for him;
But he turned, when safe on the other side,
And built a bridge to span the tide.*

*"'Old man,' said a fellow pilgrim near,
'You are wasting your strength with building here;
You never again will pass this way;
You've crossed the chasm deep and wide,
Why build you this bridge at evening tide?'*

*"The builder lifted his old gray head,
'Good friend, in the path I have come,' he said,
'There followeth after me to-day
A youth whose feet must pass this way.
This chasm, that has been as naught to me,
To that fair-haired youth may a pitfall be;
He, too, must cross in the twilight dim,
Good friend, I am building this bridge for him.'"*

NEW RECLAMATION ERA

Issued monthly by the Department of the Interior, Bureau of Reclamation, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 15

JULY, 1924

No. 7

LAND SETTLEMENT AND IRRIGATION DEVELOPMENT

Address by Commissioner Elwood Mead, of the Bureau of Reclamation, on June 9, 1924, before the Western Society of Civil Engineers, Chicago, Ill.

I DESIRE to present some reasons why greater attention should be paid to the problems of settlers in carrying out the reclamation policies of this country, and will begin with a quotation from a book of mine which describes the State land settlement policy of California and its results:

In 1917 California entered on a new policy in rural development. Under it the State is buying large tracts of unimproved land, cutting them up into small farms and farm laborers' allotments, providing roads, water supply, and other things needful to the comfort and well being of the future owners, and is then selling these farms and allotments to worthy landless people for a small sum in cash with a long time in which to pay the remainder. Each settlement has a competent director who is helping the colonists to grow better crops, to own better stock, to work together in buying and selling, and to build up a sound community life. Settlers are able to borrow money for making improvements on long time at a low rate of interest. They have the advice of the experts of the State agricultural college in laying out and equipping their farms. In many ways the obstacles which have harassed settlers in the past have been lessened or removed; and the dream of the home seeker has been made a reality.

That was written in 1920. Last week there was submitted to a committee in Congress an audit of the Durham State land settlement made in March of this year. It showed that in this time of economic stress the settlers of that colony had met their payments to the State, which included interest, and that not only had it been a solvent undertaking but there was after seven years' operation a surplus of \$142,000 to its credit. In other words, settlers have met their payments, their principal and interest, and the undertaking showed a profit to the State of nearly \$150,000.

Government reclamation began 22 years ago. Since then the United States has spent \$150,000,000 on irrigation works. These works irrigate 34,276 farms on which 131,194 people live. The towns on this irrigated area are the creation of

irrigation just as much as the orchards or dairy farms. The farms are the foundation for other industries. These have a population of 332,000. The wealth in land, in houses, the increase in trade industries, and railway freight, justify the Government's policy and furnish an indirect return for the Government expenditures. Last year's crop was worth \$65,600,000.

When Government irrigation began, this country was still in the pioneer period. While it had disposed of the greatest domain of fertile land ever administered under one civil policy, it had never had a land-settlement policy. The size of the farm unit suited to the needs of a settler, the kind of agriculture suited to a location were left to the settler. No definite information regarding quality of soil or expense of improving farms was provided. There was no credit system suited to the needs of this development nor effort to create communities made up of people who would be effective agents in development and fitted to create an attractive and prosperous rural life. In other words, all pioneer settlement was unorganized and unplanned.

Some of the Government works are of a monumental character. High dams, deep foundations, long and costly aqueducts reflect great credit on American engineers. Better than this, it has been a service conspicuous for its honesty, its zeal, and devotion to the public service. There has never in this long period been a suspicion of graft.

Thus far the record of reclamation development is fine. A series of works that will compare favorably with those of any country; a fine body of public servants to construct and operate them. But here we encounter the weakness of this development. It was the failure to recognize that it is the farmer who is to pay for these works; that their value de-

pends on securing the right type of farmer to use the water and on the conditions which determine the kind of crops which can be grown and their acreage value. A reclamation program needs, therefore, to take into account soil, climate, markets, and the cost of changing raw land into farms. Twenty years ago the need for these agricultural studies was not realized.

The reclamation act sought to perpetuate the same idea of unplanned settlement on areas where the Government had spent large sums of money on the land's improvement. It said in effect: Giving away farms in Iowa to anyone who would live on them, with no questions asked as to fitness, worked; we will extend it to farms where we erect houses that cost \$10,000 which will sell on time to the first applicant, also with no inquiry as to his industry or willingness to care and pay for the house. That the improvement was an irrigation canal rather than a house did not change the character of the transaction. It was a costly improvement to build and expensive to maintain. Its value depended entirely on how it was used; that is, on the experience, character, and industry of the settler. Selection of settlers and an agricultural program were as necessary as experience and engineering ability in locating and designing works.

Strange as it will seem 50 years from now, no provision for these things was included in the original act.

This act as passed was simple. It provided only for building irrigation works. The money was to come from the proceeds of the sales of public lands, to which were afterwards added a part of the revenues received from oil leases. The settlers who took land under these projects were to repay the Government for its outlay in 10 equal annual payments. No interest was charged, this being a more generous provision than is to be found in the irrigation acts of any other government. There was no inquiry into the

(Continued on page 102)

IRRIGATION FARMING IS A SPECIALIZED OCCUPATION

The recommendations of the Committee of Special Advisers on Reclamation provide for practical farm advisers on the staff of every irrigation project

(Continued from page 101)

qualifications of the settler or the amount of capital he brought to the undertaking. Later on, when there were more applicants than there were farms, the question of who was to have land and canals was settled by a lottery. In one case there were 3,300 applicants for 80 farms. An inquiry into the qualifications of these applicants would certainly have disclosed that there were 80 men who had the training, character, and the industry which would enable them to succeed; but the 80 lucky ticket holders in the lottery were largely irresponsible drifters, who took a flyer at a farm as they would stake out a mining claim or tackle a new job in a city.

Now irrigation farming is a specialized occupation. To succeed a man must first of all love farm life. Then he must desire to do well the things that success in irrigation imperatively demands. Men were selected by lottery because those in authority preferred to sidestep responsibility; considering what was involved it was a violation of every sound principle of development. It had cost nearly \$100 an acre to build the canals which were to water these farms. To operate them would cost several dollars an acre each year. The return from canal and land would depend on whether the lottery-ticket holder wanted to work, whether he had the money to buy his tools and livestock, to build a house, and then could acquire the knack and skill needed to water and cultivate his fields. It was no place for the city worker. Many of the holders of these lottery prizes were from the East, had no knowledge of local conditions, and they were confronted by these conditions.

Aside from the main irrigation channels and the unformed dirt roads, everything required to transform the desert into productive farms remained to be done. The land had to be cleared of brush. The farm unit had to be fenced. A house for the family and stable for the work animals had to be built. Provision had to be made for a water supply for household use. Not being familiar with local conditions these settlers were not able to buy to advantage, and were under pressure to buy quickly. Some settlers were unable to procure cows or horses locally. Many had to be shipped from other States. This added to the cost of development.

Until the house was built the settler's family had either to live in a tent or board in town. Illness often resulted, while heavy living expenses and delay in

The Committee of Special Advisers recommended the following changes in the act: That practical farm advisers be made a part of the staff of every irrigation project. That hereafter in determining whether projects are feasible there should be studies of soil, climate, cost of preparing land for cultivation, improving, equipping farms, probable value of crops, of markets, roads, and the social and economic conditions under which people will live.

The report recommends that in settling projects hereafter an inquiry shall be made into the character, industry, experience, and capital of settlers, and only those who seem qualified to succeed shall be selected. A conservative provision was included for loans for settlers from the reclamation fund to enable them to buy needed livestock and farm equipment.

beginning productive employment contributed to make all concerned homesick and discouraged. On some farms preparatory work prevented planting a crop the first season, and the settler found his meager capital swallowed up in living expenses before he had any return from the land. Before he could grow a crop the land had to be prepared for irrigation. To do this so that water would flow evenly over the surface required knack and experience. It was no job for a city clerk or even a farmer used only to rain. Money and time were wasted and the final result was so unsatisfactory that the work often had to be done over again. Few settlers could afford to buy the special equipment for leveling land cheaply which is not needed afterwards, especially settlers on small-farm units; hence the actual cost was increased and completion delayed.

This was a typical experience. It was soon found that settlers could not repay project costs in the 10 years time fixed by the act and the time was extended to 20 years. In some instances it has since been extended to 40 years. But for the man who did not have money to build a house or to buy livestock or level land, the payment period did not matter because it did not help him to develop earning power. In many cases these unfit settlers could not hang on even if all payments were eliminated.

On one project in the first five years 550 had had to give up and leave, and

only 400 were left. On some projects the transfers run into thousands.

The original idea was that the Government reclamation would be mainly confined to public land. It was soon discovered that the best opportunities for development were on land in private ownership. A number of projects begun by private enterprise but with inadequate capital needed money to complete storage works, build better canals, and do other things necessary to make them effective. By taking over these projects the Government could rescue investments that otherwise would have been lost and enable settlers to succeed who would otherwise have to abandon their homes.

The reclamation act became, therefore, a life-saver to bankrupt or embarrassed private projects, and a majority of the projects under this act were begun by private enterprise. This brought a new condition into settlement not anticipated in the act. When the Government took over a private property it used public money on which no interest is charged to improve a private property. The land under these works was not alone privately owned but in many cases was held in large tracts. With no restriction on their actions the owners of this land capitalized the Government's generosity and charged settlers high prices. The development became a gold mine for the real-estate speculators. They were early on the ground, secured options on large tracts, and then raised the price to the real settler beyond what he could afford to pay. Uninformed and oversanguine purchasers, thinking they were dealing with a guaranteed Government enterprise, paid prices far above real values. On one project wild sagebrush land worth \$5 an acre sold for \$200 an acre. On another project 5,000 acres bought at \$15 an acre was sold to settlers at \$90 an acre. Much of the present financial distress of settlers has come through the inflation of prices of privately owned land. Speculation has been an evil that has done much to destroy the desirable social and economic purposes of the act.

The depression in agriculture, the burden of interest payments on private debts, the lowering of the morale of settlers due to the hardships and discouragements of years, led to large arrears of payments to the Government, and finally to two moratoriums to settlers.

Secretary Work, of the Interior Department, realizing that something was radically wrong and not having the time

(C continued on page 103)

OTHER COUNTRIES FOUND AID TO SETTLERS NECESSARY

Help is given in the practical details of farming, cooperation in buying dairy stock, obtaining wholesale prices for farm materials, and combining in marketing products

(Continued from page 102)

to make a study of this situation himself, appointed an advisory board to go fully into the matter and report what should be done. The members of this board were: Former Governor Thomas E. Campbell, of Arizona, chairman; Dr. John A. Widdsoe, of Utah, secretary; former Secretary of the Interior James R. Garfield, of Ohio; Hon. Oscar E. Bradfute, chairman of the Federal Farm Bureau Federation; Hon. Clyde E. Dawson, director of the United States Chamber of Commerce, irrigation lawyer, of Colorado; Dr. Elwood Mead, professor of rural institutions, University of California.

This board, after six months' investigation, made a report which has been published as Senate Document No. 92.

Its conclusions are summarized in the statement that the act and its operation failed to realize that reclamation is in the end an agricultural problem. The committee's report dealing with the claim of settlers that the works cost more than they are worth, said:

Delayed payments or no payments and the present plight of settlers are not due wholly, however, to increased project costs. Reclamation by irrigation is the result of the joint efforts of the engineer and the farmer. The engineer builds the irrigation works; the farmer must pay for the works and make a living from the reclaimed lands. The major part of the engineer's task is soon over; the farmer's task lasts while the works endure. There can be no irrigated farm without the competent engineer; but there will be no payment for the works nor community development under them without the successful farmer. The engineering structures of the Federal irrigation projects have been substantially built and maintained; but the farmer's needs have been incompletely met. A fundamental error was made in believing that the construction of irrigation works would of itself create irrigated agriculture. The reclamation act was based on that assumption. Attention has been centered almost entirely on engineering features. Settlers were accepted without capital or experience. They were not organized to work together but were left to struggle without sufficient aid or direction to complete what the Government had only begun. It has been demonstrated that the Government can build irrigation structures of the highest quality; but how farmers on the Federal irrigation projects can repay the cost of these structures within reasonable time limits is yet to be demonstrated. The overemphasis of the engineering side of reclamation by irrigation is one cause of project difficulties.

The project settlers, particularly on the public lands, were unselected as to fitness by experience or financial ability to undertake irrigation farming. Many entered on the venture with little conception of

Irrigation construction that is not followed promptly by irrigated agriculture means loss to some one. An unused or partly used canal is like an idle or partly used factory. Delayed agricultural development has wrecked more irrigation enterprises than all other causes combined. The costlier the work the more important it is that this fact be recognized. Neglect to include plans and methods for bringing land promptly under irrigated culture is to neglect a fundamental condition of success. Hereafter more attention must be given as to where and how money needed in agricultural development is to be obtained; where and how settlers are to be secured; and how settlers must be aided and directed to enable them to use their money, effort, and time to the best advantage. The best answer is found, however, in what other countries with conditions similar to ours have found it necessary to do.

the experience or physical obstacles they would meet in creating a farm. It was a situation which made the agricultural needs of this heterogeneous body of water users the most important factor in this development. The inexperienced farmer should have been given more and better information and advice; the poor farmer, with honest courage but little or no capital, should have been provided with proper credit facilities; the farm with a rough, rolling surface should have been leveled; the greedy owner of private lands, ready to trade upon the natural desire of vigorous, hard-working men for independent homes, should and could have been squelched; the good farmer, with small business capacity, should have been given the assistance of cooperative organizations for buying and selling; all should have been supplied with intimate advice from competent official advisers on all farm matters, and by every effort the way should have been made easier for the water user, who not only profits by the labor and skill of the engineer, but who also absorbs engineering mistakes and pays engineering bills. Such singleness of purpose in winning project success by helping the farmer would have brought greater success to the projects, avoided the present danger, and would early have uncovered needed changes in policy or methods.

This brings up the question, Are the recommendations of this board of a character which ought to commend themselves to public opinion and be enacted into law by Congress? In deciding this the following facts are unquestioned. The acreage cost of irrigation works will be greater in the future than they have been in the past. They are now greater than

they were 10 years ago. Locations where canals can be built at small cost have been utilized. Hereafter they must follow more difficult routes, and storage works must be included in all important schemes. This means less margin between outlay and income and greater need to guard against mistakes and waste. Every factor that will lessen risk and hasten development must be utilized. The revenue of these works must come from irrigated crops. If human experience has any value we ought to heed its lessons, and in this connection Australia is one of the countries most worthy of our attention. It began irrigation development along the lines followed by the United States. It believed that if canals were built settlement and agricultural development would follow. It left the settler to work out his own salvation and, as with the United States, this proved a continuous and complete failure.

After 25 years of experience, the Government reversed its policy. A commission was sent to Europe to study Government land-settlement policies in Scandinavia, Germany, Italy, and Ireland. As a result a farm-development program was worked out. Statistics showed that it would require \$3,750 to prepare a 40-acre farm for irrigation culture. Settlers with this much money could not be found, and the next step was to decide the amount of capital a settler must have to make him a safe risk for the Government. That figure was fixed at \$1,500, the Government agreeing, if the settler had that much money, to lend him \$2,500. Since then it has raised that limit to \$3,000. The terms of loans were generous—20 years' time to pay for a house; 30 years' time to complete payments on land; and 5 years' time to complete payments on livestock and tools, with interest at 4½ per cent. Men who understood the practical details of farming were hired to help these settlers organize under the different projects. It helped them cooperate in buying dairy stock. It enabled them to obtain wholesale prices for the material needed in building their houses, and to combine in the marketing of their products.

Under that act 32 separate settlements have been created. The Premier, in speaking of its operation, said it had placed ten times as many people on the land as were there before; it had created a new system of agriculture under which people on 10, 20, and 40 acres of land

(Continued on page 104)

REORGANIZATION OPERATIONS

THE Secretary's order of April 9 and the organization chart, published in the May issue of the *NEW RECLAMATION ERA*, define in a general way the respective duties of the several divisions of the Bureau of Reclamation. It would not be practicable to define all the duties of each division, but Commissioner Mead cites the following to serve as illustrations of the operations of the reorganization order:

Damage claims against the United States.—Such a claim shall be referred by the chief clerks to the officers of the appropriate water users' organization for indorsement of their approval or disapproval. The chief clerks shall then transmit the claim to the district counsel for review and opinion which opinion shall be final in case it rejects the claim, unless the claimant appeals. Appeals may be taken to the director of finance, the commissioner, and the Secretary. Final approval of claim must be made to Washington. Detail instructions will issue later.

Cost keeping.—The engineering division will indicate the nature and classification of cost keeping desired. The director of finance will have general jurisdiction of cost keeping matters. The work of cost keeping is to be done in the Denver office under the direction of the office manager and in the other field offices under the direction of the chief clerks.

Business matters.—Business matters affecting the bureau will be conducted in the

field under the direction of the director of finance who will assign the work to district counsel or chief clerks as may be most expedient. Final action on any business matter that may affect construction or operation will not be taken until the matter has been submitted to and reported on by the engineering division. To illustrate: Public lands should not be leased until it is ascertained whether and how such lease will affect construction and operation; contracts for the sale of electric power or of a water supply must be based upon engineering reports as to available supply, ability to deliver power or water, and other pertinent information.

Control of offices and buildings.—The engineering division will be responsible for the care of offices and buildings on all strictly construction projects and buildings elsewhere used only for storage of engineering equipment. The Denver office will be under the control of the office manager. Other field offices and buildings will be under the general management of the director of finance, whose local representative on each project shall be the chief clerk.

The following matters will be handled under direction of the officers named:

Chief engineer.—Irrigation, design, construction, operation, and maintenance of irrigation works, including motor vehicle, power and pumping plant operations, corrals, railways, and boats.

Director of finance.—General supervision of business operations and financial records, including accounting, water contracts, disbursements, and collections; crop reports; hospitals; mercantile store and mess-house operations; sale of electricity; town-site development (financial features); insurance; field printing; publication of notices; suspended contracts.

Director of farm economics.—Settlement; farm development; community development; land classification; irrigable area changes.

Permanent committee.—A standing committee to be known as the "Field committee on betterment" and to consist of the commissioner, director of finance, chief engineer, director of farm economics, chief field counsel, and office manager, shall meet on call of the commissioner or his representative to confer on matters affecting the bureau. The commissioner, if present, or the director of finance in his absence, shall be chairman and the office manager secretary of the committee. The committee shall make reports to the commissioner. Any member of the committee who is unable to attend any meeting without added cost should submit any suggestions in writing and may delegate someone to act in his stead.

The following order was approved by the Secretary of the Interior on June 7, 1924, to make effective the reorganization of the legal division of the Bureau of Reclamation. This order is effective July 1, 1924:

LAND TITLES

Title opinions by the chief field counsel or by district counsel designated by him shall be final.

CONTRACTS

Executed under general authority.—Authority is hereby given to the director of finance, Bureau of Reclamation, to execute and authorize in writing his subordinate officers to execute "routine contracts" as hereinafter defined of the following classes:

(a) Any disbursement contract not exceeding \$10,000 in amount required to carry out the plans duly authorized by the department.

(b) Any collection contract not exceeding \$10,000 in amount where the plan under which collection is made has previously been approved by the Secretary of the Interior.

A "routine contract" is hereby defined to be a contract of a form conforming to one approved by the Secretary of the Interior for general use.

Executed under special authority.—Other contracts (except in cases of emergency) shall be executed only after special authority shall have been given by the Secretary of the Interior for that purpose.

BONDS

Bonds given in support of contracts shall be executed under the same regulations as the contracts which they accompany.

LAND SETTLEMENT AND IRRIGATION DEVELOPMENT

(Continued from page 103)

were making a comfortable living and meeting their payments to the Government. It has continued without change for 14 years, and is now the basis of the new contract with the English Government for the placing of 3,000 additional settlers on farms. The State of New South Wales has worked out a similar settlement program under which 6,000 farmers from Great Britain are to be placed on farms in that State. The preliminary investigation included gathering statistics in widely differing countries about the cost of creating a farm on unimproved land and it was found that this cost would vary from \$5,000 to \$10,000, excluding the land and the water right; that the money would be spent in preparing the land for irrigation, erecting the necessary buildings, purchasing livestock, building fences, and meeting the costs of living and cultivation during the preparatory period.

The basis of this development will be that the settler shall have \$1,500 in money.

The Government will supplement that money with a loan of \$3,000 with interest at 5 per cent. Australian legislation for giving aid and direction to settlers is found in recent legislation in India, in the extension of irrigation in Egypt, and is a part of the irrigation policy of South Africa. Sooner or later it must become a part of the policy of the United States. If we can afford to risk an expenditure of tens of millions of dollars in the construction of canals and reservoirs for a single project, we can not afford to ignore the needs of the development of farms by which alone this money will be repaid. It is only by following the plans outlined by the advisory board that we can bring the latent resources of these projects into use, create opportunities for poor men, enable them to maintain American conditions of life, and build an agriculture and rural civilization that must be secured to justify the continuance of reclamation as a Government policy.

RECLAMATION DIFFICULTIES OF OTHER COUNTRIES

A. D. Lewis, director of irrigation of South Africa, draws a parallel between conditions on the projects in the United States and those in Australia and South Africa

THAT conditions on the irrigation projects under the Bureau of Reclamation are not unique is of course well known to students of irrigation. Other countries have passed through or are passing through many of the same difficulties now being experienced in the United States. Changed economic conditions following the World War have left their mark on agriculture generally, regardless of location, and not least of all on irrigation agriculture. The following extracts are from an article written by Mr. A. D. Lewis, director of irrigation of South Africa:

As an engineer, I am tempted to deal with some of the many interesting engineering problems, especially with those which are peculiar to this country. However interesting these may be, and however important their proper solution may be to the future of irrigation, there are other and far more important factors which work towards the success or failure of irrigation, and amongst these might be mentioned agricultural, financial, political, and social considerations. People are apt to overlook these and to assume that it is only necessary to construct an irrigation work as perfectly as engineering skill will allow and success is bound to follow as the night the day.

America generally has made the same mistake of treating the problem as primarily an engineering one, but in spite of some of the greatest triumphs of engineering skill, irrigation has not had that rapid path to success which was anticipated. Unexpected difficulties, quite unconnected with engineering, have arisen on some of the schemes. The population has not taken to the irrigated areas rapidly, and those who have settled on them are struggling against unexpected financial and agricultural difficulties; while the Federal Government, which has incurred large expenditure, is failing to get in the repayments due according to the prearranged plan. So serious has the problem become in that country that recently the whole organization of Federal irrigation has been altered.

Australia is fighting against the same difficulties and even in a more aggravated form. The irrigated areas are filling up much too slowly, the settlers are not meeting their obligations to the State, and large sums have had to be written off. Again the troubles have been due not to engineering faults, but rather to certain unexpected social factors, and the organization of state irri-

gation has been altered to deal with these.

In South Africa we are learning the same lessons and we can not shut our eyes to the fact that many schemes which were initiated with the brightest hopes of success are to-day struggling against extraordinary difficulties, not, as some people have alleged, entirely due to faulty engineering, but chiefly owing to far wider causes.

Let us consider some of the factors and difficulties with which irrigation has to contend in this country. First, there are purely physical difficulties. Irrigation works will always be expensive in this country. In India the average cost of irrigation works has not exceeded \$15 per acre. In South Africa the average cost of State or State-aided works has exceeded \$100 per acre, and, as the easier works are generally undertaken first, the cost is likely to increase steadily beyond this figure.

Irrigation differs from telegraphs and railways in that the latter can easily follow and serve areas already densely populated, whereas irrigation development is fixed by the courses of rivers and still more closely by the irrigable areas and storage sites. These can not be shifted to suit the population; the population must be brought to these sites, which can only be successfully done after the works are completed. For these reasons, the social and human problems of getting the proper population to the irrigated areas and helping them when there, are the fundamental factor in irrigation development.—A. D. Lewis.

Transportation and marketing of produce present many difficulties. Not nearly enough attention has been given to these matters by irrigators, although much can be done to meet the high costs and transportation difficulties by growing more highly profitable crops; condensing the product to save transport, for example, alfalfa to cows, cows to milk, and milk to butter or cheese or pigs, growing such produce as can be preserved for use in time of drought and scarcity when it has an exceptional value.

The most serious difficulty, however, is the slow rate of increase in the agricultural population possessing the necessary capital and experience to make a success of irrigation farming. Some of the reasons for the slow increase are lack of inclination for and experience or training in irrigation farming, lack of capital among those who are otherwise suitable, large

individual private holdings of irrigable areas, and slow influx of immigrants.

Without definitely expressing an opinion as to the extent of Government interference which may be desirable, it will serve a useful purpose to state some of the directions in which improvement is required:

As to transportation, railway and irrigation development should be considered together. As to markets, closer study of the markets of this country and of the world should be made and the information should be carefully assembled and kept up to date and disseminated among the producers. Cooperative selling should be encouraged and competent persons should advise as to the best crops to grow and the best means of condensing or preserving the produce, with sound methods of providing the necessary capital. As to the population difficulty, something must be done to attract a larger number of desirable people to the irrigation schemes and to help them to achieve success after arrival.

Possibly one of the chief difficulties is the private ownership of large areas irrigated or capable of irrigation. It is human to want to get the maximum price for any asset such as irrigated land, and it is too much to expect the private owner to lower his price in the altruistic hope that he is benefiting the Nation directly or indirectly; but when the asset owes its enhanced value chiefly to expenditure of Federal money, the Nation should exercise some pressure to insure that the man who holds far more land under a Federal-aided scheme than he can possibly work himself will part with the surplus at a price which will enable the buyer, who is going to work the land, to have a reasonable hope of success. Australia had this trouble 25 years ago and solved it by expropriation before State works are undertaken. We still await a solution in this country.

"The articles that have appeared in the NEW RECLAMATION ERA seem to be written from the viewpoint of the men on the project farms, are constructive and helpful, and have struck a responsive chord on the project farms generally."—Burton Adams, President Irrigation District, Sidney, Mont., Lower Yellowstone project.

"We have always read and enjoyed the RECORD and approve of the NEW RECLAMATION ERA."—E. N. Hanson, Caldwell, Idaho, Boise project.

FARM ADVISERS NEEDED FOR SUCCESS

MR. MARK AUSTIN, general agricultural superintendent of the Utah-Idaho Sugar Co., has written as follows to the Secretary of the Interior:

"I thank you for your letter of May 15 and the copy of the report of the fact-finding commission. No greater move has been made along the lines of improvement in reclamation than your appointment and work of the fact-finding commission. If this had been done early in the history of reclamation by the Government, many millions would have been saved, both to the Government and the settlers, because the settlers, many of them, who are not acquainted with agriculture, especially under irrigation, have spent years trying to develop lands that were unsuitable.

"Now, if you can work out some thorough systematic rotation of crops suitable to soil and market under the direction of Government agency by using thorough, competent, practical, experienced men in whom the settlers have implicit confidence, who have made a thorough success on the project where they will be expected to work, and have the executive ability to do the work, very great improvement will be made in the standard of their

farming, their yields, and markets. So many of our farmers plant their crops entirely out of order to get proper results. I know this from my experience with them in these Western States for the last 30 years, and there is nothing that will bring up the standard of agriculture and condition of the soil more than that of beet culture, as it is garden culture on a large scale, as you know. But where beet culture can not be engaged in, then they should have some other suitable cultivated crop for their conditions in proper crop rotation."

SAVE HOME-GROWN SEED

It is generally recognized that there are advantages to the home gardener in saving seed where it is grown, both for marketing to his neighbors and for his own use. These advantages are that the selection which the gardener gives his seed plants, although not greater than that which the seed grower gives his seed stock, is often better than can be given to seed that is placed on the market; and that the plants selected will be the ones which succeed best under local conditions.

TRANSFERS OF LAND A SERIOUS PROBLEM

The transfers of land and water-right contracts remain one of the serious problems confronting the reclamation endeavors of the country. The transfers or assignments were generally made at advanced prices; that is, the farmer sold his equity in the farm unit and the water contract at a price over and above the money he had actually paid out. The purchaser was under the obligation of paying to the Government the usual annual installments, and in addition the premium paid to the former owner. After several such transfers have occurred, each at a price above the cost to the previous owner, the ultimate purchaser often carries an obligation to the respective purchasers, which overshadows in magnitude the obligations to the Government. When the pressure of this heavy obligation weighs upon him, he is likely to blame his condition to the Government reclamation plan, when, as a matter of fact, the project construction and the operation and maintenance charges are small compared with the other obligations that he has to meet. Such a pyramiding of costs is most unfortunate, for it is nearly always disastrous to the credit and to the peace of mind of the farmer.—*Report of Committee of Special Advisers on Reclamation.*



The old and the new—Klamath project, Oregon-California

COOPERATIVE OPPORTUNITIES FOR RURAL-MINDED PEOPLE

The original reclamation act provided no selective control over prospective settlers, and as a result many farm units were entered by people not particularly suited for the difficult work of reclamation

A MAIN purpose of the reclamation act was to provide opportunities for homestead making for rural-minded people. Making a homestead a place able to support a family and desirable for family life must remain the central thought of every activity connected with Federal reclamation.

It was hoped that the homesteader under the Federal irrigation works would settle upon the land with a strong determination to subdue the soil, to build a home, and to add another rural farmstead to the thousands which form the stable foundation of our Republic.

It is regrettable that no provision was made for selecting project settlers who really intended to make a homestead. It was not to be expected that every person who settled on the projects could remain to carry out the homestead idea. The exigencies of life are too many and human nature too variable, but the larger the proportion of settlers with real homemaking intentions the larger, naturally, would be the number of original settlers on the projects after a few years.

Numerous land transfers, or assignments of water-right contracts, have occurred since the project lands were settled. There are several classes of land transfers, or transfers of water-right contracts, on the Federal irrigation projects.

First, those due to such conditions as may enter into every life, ill health, death, etc.

Second, those that result from the restlessness of the settler. There is a large class of people, even in our latter-day civilization, who are born pioneers and who seldom remain long in any one place. They plow the virgin soil, clear the land, grow a few crops, make the land a little more easily handled by the succeeding farmer, and then start out in search of a similar opening somewhere else. These restless pioneers, born to the life, have been of great service in the building of the West and in the conquest of the desert. They are not rovers; they are discoverers, limited in this day to the conquest, successively, of a few acres of land, separated by a few hundred miles at the most. This type of settler, however, has been the cause of a number of land transfers.

Third, those who, without intending to move, find an unusually good opportunity to sell out at a good profit, and yield to the temptation. Such farmers usually go the city after the new deal has been consummated, but only for a short time,

for they generally return to farm life and use what is left of their money for the building of another farm homestead.

Fourth, those who, although farmers in good faith, for some reason or another have become weary of farm conditions and without transferring title to the lands move into the city and depend upon tenants to make some money for them out of the farm.

Fifth, those who made use of the opportunity offered by the Government to secure land and water on most easy terms, and with the intention to hold them until the unearned increment would enable them to sell out at a large profit. Such men are seldom farmers. They are always seeking for an opportunity to sell the lands at a good profit to themselves. These are the speculators.

Those who buy from any of the above classes are, mostly, bona fide farmers who intend to try to make a living from the farm. The percentage of those who buy with a view of selling again at a profit is relatively small and can almost be ignored in this discussion.

Any discussions relative to the financial ability of the farmer must consider the complexity of farming as a business. Varieties in climatic conditions, interference by insect and other pests, widely varying economic environments, and many similar factors not only make agriculture a difficult and somewhat precarious occupation, but also one that tends to absorb all the energies of the farmer. Moreover, it requires, if success is to be attained, an individual with a great diversity of gifts. This, of course, is one reason, if not the main one, why through governmental and other channels aid must be extended to the farmers of a kind not required by workers in other fields. The actual production of crops from the soil and the feeding of these crops to livestock require such constant daily attention that the average farmer is especially handicapped when the business of disposing of the crop becomes necessary.

In this field of the farmer's activity, perhaps no better assistance can be given than that possible through cooperative organizations. If the farmer keeps in touch with expert information relative to the production of his farm—and every farmer must be the master of his own homestead—it is usually desirable and advisable to secure someone acting for a group of farmers who may give expert advice with respect to the marketing of

the crops. Cooperative enterprises maintained for the purpose of giving the farmer aid, and not to force unseasonable issues, may be prime means of securing financial success for farming communities. Such cooperative associations need not concern themselves alone with marketing. The buying of the things that the farmer needs at the best prices for known quality may be almost as important. The farmer can not be an expert in buying, manufacturing, and selling, and also a pioneer in the most complex of the activities of man. He must depend on others in fields where his individual knowledge is insufficient. If the farmer is informed in detail concerning agricultural operations on the farm, he can well afford to content himself with a general knowledge of buying and selling, and operate through organizations maintained by agricultural communities for these purposes.

Irrigation lends itself in a remarkable degree to the spirit of cooperation. A whole community is dependent for its economic success upon the canal which carries water to the fields of the community. If there is a break in the canal, it is the concern of every member of that community. If one farmer misuses the water, he injures the whole community. By the common interest in the supply of irrigation water, communities are made to act as units. This feeling, which is developed and fixed as successive generations live under the ditch, is carried over into the social and spiritual life of the people, and makes possible, better than under any other conditions, the successful fostering of cooperative enterprises that are intended to give the reasonable help that the community needs.

On the Federal irrigation projects, cooperative enterprises should be undertaken and fostered by those in charge of the project, so that the farmer may give more attention to the production of crops, which is peculiarly his work; and that he, nevertheless, may be so protected in buying materials for himself and his family and in selling his crops that he may enjoy, as the results of his efforts, the highest degree of prosperity.

"Every page of the NEW RECLAMATION ERA is very interesting and of much value to every farmer."—C. Deane Haughtelin, *Bard Star Route, Yuma, Ariz., Yuma project.*

AUSTRALIA MEETS SIMILAR PROBLEMS

THE conditions under which farms are carved out of new irrigated areas in Australia are similar to those in the United States. Building material costs more in Australia and livestock less. Labor costs are about the same.

Last year one of the Australian States gathered all the information available about what it would cost to improve and equip irrigated farms varying in size from 15 to 40 acres. The Government wished to secure definite reliable information to be used in fixing the capital a settler should have to give him a fair chance to succeed, and to determine how much money would have to be loaned to settlers who did not have the necessary amount to enable them to complete improvements and to earn a living while carrying on this development. The statistics gathered show that the development expenses varied from \$7,000 to \$10,000 per farm. The expense on American reclamation projects can be made less than this, but it will not be less than \$4,000 for a 40 to 80 acre farm, and it is often twice this sum.

In Australia a settler who takes 40 acres of land is required to have a capital of his own of \$1,500 to \$2,500. The State then lends whatever is needed to complete the farm's development, up to a maxi-

mum limit of \$3,000 to \$5,000. Some countries require a settler to have a capital equal to one-tenth of the cost of the farm after it is improved. Requiring the settler to have some capital has proven to be an advantage to both the Government and the settler. Wherever possible the settler is required to buy his perishable equipment with his own money. This includes farm machinery and livestock. Permanent improvements, like houses and leveling lands, may be made security for loans. The interest rate in other countries on these development loans varies from $3\frac{1}{2}$ to $5\frac{1}{2}$ per cent. The period of repayment runs from 20 years, where secured by houses and other permanent improvements, up to 70 years, where the land is the security. Loans run up to 90 per cent of the value of the improved farm, and up to 70 per cent on permanent improvement. Aiding the settler to get his farm into full production increases his income and thus promotes all repayments to the Government.

Within the last half century the Australian States have spent over a hundred million dollars building Government irrigation works. In the earlier years of this development nothing was done for the settlers except building the canals and

reservoirs. These were years of continued financial losses, both to the Government and to settlers. Settlers left to struggle alone with the expenses of leveling land and doing other things needed to create the irrigated farm could not and did not meet their payments. Then the Government awoke to the fact that it was the farmer who repaid project costs and that irrigation development was only justified if it was an economic success and the people who cultivated the land were contented and prosperous. A system of aid and direction for new settlers was inaugurated under which those of limited means could borrow money needed to enable them to live in better houses, own better stock, work with better tools, obtain larger returns, and thus meet obligations to the Government. The result is a new and better agriculture and a more hopeful and prosperous rural population.—*Report of Committee of Special Advisers on Reclamation.*

"The NEW RECLAMATION ERA certainly ought to merit the full approval of all for whom it is published."—*Alfred L. Marshall, Weeping Water, Nebr., North Platte project.*

"I take lots of satisfaction in reading the NEW RECLAMATION ERA. I think there are lots of good points in it."—*George Laucomer, Scottsbluff, Nebr., North Platte project.*



Stacking alfalfa on the Boise project, Idaho

PASTURES ARE ESSENTIAL FOR SUCCESSFUL DAIRYING

F. C. Becker, of St. Ignatius, Mont., points out the advantages and disadvantages of different kinds of pasture grasses in Montana and similar localities

IF THIS is to be a successful dairy country, good irrigated pastures are essential. Profitable dairying everywhere depends on pasture.

On many reclamation projects the acres in permanent grass are the most valuable acres of the farm. A good irrigated pasture, well established and well irrigated, should furnish feed for two cows for six months every year on each acre. And that is the equivalent of \$50 net return.

Good pasture grasses should be both nutritious and palatable to the cows; should come early in the spring and stay green late in the fall; should be rapid in growth, and renew the growth quickly when eaten off; should be deep-rooted and form a thick, tough sod; and above all, should be permanent. No one grass has all these requirements so a mixture is necessary for the best results. A mixture of grasses will greatly outyield even the best individual grass. Cows will do better on a mixed pasture because they like variety, and because different grasses come on at different times.

Of all grasses for pasture, timothy is the poorest. It is least nutritious; it comes on late, and does not easily recover when eaten off; it is shallow-rooted and stools instead of forming a sod. It is short lived at best, and especially so when pastured. It can be killed off in a single year when pastured off too closely in the fall, for it forms little bulbs at the root of the stalk where it stores up nourishment for its growth the next spring, and if they are eaten off it weakens and dies. The only good points about timothy are that the seed is cheap and it germinates readily. Timothy should be omitted from the pasture mixture.

Redtop is another grass that should be omitted. It is quite nutritious, but the cows will not eat it if they can get any other grasses. So it is eaten off least and will in time drive out the other and better grasses.

Kentucky blue grass in some parts of the country is so superlatively good for pasture that it is by many people considered the only pasture grass. It is highly nutritious and palatable; it forms a thick turf; and it is permanent. But it does not make a heavy growth; it does not like a hot, dry atmosphere; and though it will stay green the whole summer if it is kept moist, it makes practically no growth in July and August, the months when good pasturage is most important. Naturally, it dries up and remains dormant during those months. Its roots are very shallow. Even to keep it green re-

quires almost continuous irrigation. It is not adapted to our climatic conditions. Also the seed is expensive; it germinates poorly; and it is so small that the young plant has not enough substance to stand even one hot, windy day when it first comes up. It is hardly worth putting in the mixture, or only in small quantities.

Canadian blue grass should be omitted from the mixture. The only difficulty is to keep it out of the pasture, for in this country it seems to spread naturally and take up irrigated fields.

Holland, Switzerland, England, New Zealand, are all lands where the natural carpet of thick green grass is the most striking feature of the country. In all of them, good pasture land is more valuable than good plow land. In England, fields have been kept in pasture for more than a hundred years; not waste lands but the very choicest fields, and leases always specify that they must be fertilized and not broken up.

The labor of irrigating the fields under pasture which have a thick heavy sod is almost nothing. They practically irrigate themselves. Also there is no expense for harvesting. The cows do that.

The best pasture grasses for our conditions are not so well known as those already mentioned. Meadow fescue, the great pasture grass of England, sometimes called English blue grass, is the best. It is as nutritious as Kentucky blue grass and as palatable. It makes easily four times as much growth. It has a rich green color; it is deep rooted; and though it does not spread so rapidly from the roots as Kentucky blue grass, it does not grow in stools and will in time make a fairly solid turf. It is permanent, and it does especially well in clayey soils. It will grow 4 feet high or better by the latter part of June, and comes on rapidly when eaten off. It is early in the spring and late in the fall. The seeds are fairly large and germinate readily.

Next in importance comes orchard grass. It is so hardy and adaptable and permanent that it succeeds where no other grass will endure. It is fairly nutritious and very palatable when not too old. It is almost the first grass out in the spring and the last to offer a green bite in the fall. When eaten off it grows up again with extreme rapidity. Though the leaves are somewhat coarse, they are tender and very succulent. The plant is deep rooted and a great drought resister. Its greatest fault is that it grows

in stools or hummocks and will never make a tight sod, so it is chiefly valuable in a mixture where other grasses will fill in the bare spaces. The seed is fairly large, and it germinates and establishes itself very easily.

English rye grass, also called perennial rye grass, is a most important pasture grass. It is a finer and shorter grass than the last two. In a mixture it will do a great deal to fill in all the space and make a close turf. It is nearly as nutritious as Kentucky blue grass, makes a good deal more pasturage, and is much more likely to make a stand, for rye grass germinates most easily of all the grasses. It comes on very quickly from seed and will be the first of all the grasses to make a good showing. It is therefore used in most lawn mixtures, and should be in all pasture mixtures.

Italian rye grass should not be confused with the English rye grass. It is an annual, similar in appearance but larger and, of course, grows much faster from seed. It will be 3 feet or more in length by the end of June from seed sown very early in the spring. It is worth putting into a permanent pasture mixture for the sake of the feed it will make the first year, but there is danger that it will, in its quick and vigorous growth, smother out the perennials which are slower in starting. The seed should not form more than 10 per cent of the mixture.

Tall meadow grass is a marvelous grower. It is out first of all in the spring and will be several inches high before the other grasses are green. It does its best in a heavy, clay soil. It is fine and tender, very permanent, and so palatable that the cows will walk about picking out the tufts of this grass among all the others. Such a grass is obviously of the greatest value in a pasture. The only disadvantages are that the seed is rather expensive and many seedmen do not carry it. Also it is very light and will not work through any seeding machine.

Brome grass is still another grass of value. It is coarse appearing, but leafy, and seems to be palatable to cattle. It spreads from the roots, but being coarse does not make a tight sod like blue grass. It is extremely hardy, deep-rooted, drought resistant, and fairly productive. The seed is large and will block the seeder.

Any pasture ought to have some clover, both to balance the ration and because the grasses grow better in connection with a legume. But the clovers come on faster than most grasses, with the exception of

(Continued on page 110)

COMMISSIONER MEAD VISITING PROJECTS

Doctor Mead left Washington June 8 on his first official trip to the field since he was sworn in as Commissioner of Reclamation.

His itinerary includes visits to the Klamath, Okanogan, Yakima (including the Kittitas division), Umatilla, Baker, Boise, Minidoka, Sun River, Milk River, Shoshone, Huntley, North Platte, and Belle Fourche projects.

The commissioner plans to work out some of the problems connected with the settlement and development of Federal irrigation projects in cooperation with the State agricultural colleges and agricultural experiment stations. With this in mind, he has arranged for meetings with the officials of these institutions all along the route of his travel.

The first of these series of conferences was held at Denver, in which the following participated: George C. Kreutzer, the newly appointed director of farm economics; President Charles A. Lory and Prof. L. A. Moorhouse, of the Colorado Agricultural College; Edward D. Foster, State commissioner of immigration; Tolbert R. Ingram, deputy State immigration commissioner; A. J. McCune, former State engineer; R. P. Teele, economist, Bureau of Agricultural Economics; A. C. Cooley, agriculturist, Bureau of Plant Industry, and P. A. Ewing, assistant irrigation economist (Berkeley), of the Department of Agriculture; D. H. Propps, North Platte project, Mitchell, Nebr.; James A. Holden, superintendent of the Scottsbluff, Nebr., experimental farm; and F. E. Weymouth, chief engineer; C. R. Trowbridge, chief inspector; H. L. Holgate, chief field counsel; B. E. Hayden, industrial agent; and Andrew Weiss, superintendent of the North Platte project, of the Bureau of Reclamation.

MARKETING EGGS

Quality is the great factor in market value.

A good market egg requires (a) good production methods on the farm; (b) good handling methods during its journey to market; (c) speed of delivery from the hen to the consumer.

The best method of marketing for each producer depends upon (a) volume of egg production; (b) proximity to consuming centers; (c) shipping facilities; (d) cost of transportation service; (e) available buying or marketing agencies; (f) time and labor costs required in preparation and delivery.

PASTURES FOR SUCCESSFUL DAIRYING

(Continued from page 109)

oat grass, and there is always danger of bloat among the cattle in the early part of the season. White Dutch clover is the most important clover for the pasture mixture because it seldom causes bloat, helps form a tight sod, and is permanent. The other clovers are not. It is generally advisable to put in a little alsike clover, and some people like a little mammoth red clover. Both are longer lived than medium red. A few people feel safe in putting in half a pound, or even a pound, of alfalfa seed per acre, and others recommend two pounds of yellow-blossom sweet clover. With the last, there is no danger of bloat.

For the proper proportions I should recommend the following: Meadow fescue, 6 pounds; orchard grass, 4 pounds; English rye grass, 4 pounds; tall meadow oat grass, 3 pounds; brome grass, 2 pounds; white clover, 1 pound; alsike clover, 1 pound. This is enough for one acre. The formula may be modified by adding 2 pounds of Kentucky blue grass for those who want it, and 2 pounds of Italian rye grass to get more pasture the first year. If it is not possible to get the tall meadow oat grass, add 1 pound each of the fescue, orchard, and rye grass. For those who do not like the brome grass it may be replaced by

the same quantity of orchard grass which will best take its place in the mixture; and the other clovers may be added. In general, it will take about 20 pounds of seed per acre. Buy your seeds separately and mix them yourself.

Grass seeds are small and do not have much substance. They must not be covered deep, and the soil must be firm so that the little rootlets can take hold. Most failures in getting a stand are due to loose soil and too deep covering. The field ought to be prepared in the fall; but some good stands have been secured by disking clean stubble fields in the spring and then harrowing well before sowing. The top layer of soil ought to be as fine and smooth as it can be made, the seed covered very lightly and then kept moist. If the spring is favorable, as in 1923, one may trust nature to keep it moist until the new growth is large enough to irrigate by flooding. The corrugation method of irrigation is sure to bring the seed up and keep it growing in a dry year. On a small acreage, I like best to cover the field, after sowing, with straw in moderate thickness. This holds the moisture, shades the tender young plants, and permits irrigation by flooding without washing the ground or baking the surface. It is certain to produce a good stand.

Advice from Governor Scrugham, of Nevada, has been received to the effect that he will appoint a land settlement board under the terms of the soldiers' settlement act of 1919 and arrange a meeting of this board and the University

of Nevada officials with Commissioner Mead in Reno on June 19 for the purpose of discussing ways and means of further cooperating with the Bureau of Reclamation in carrying out its plans for investigational work and farm economic program.



Peach time on the Okanogan project, Washington

COOPERATION IN THE MARKETING OF POULTRY PRODUCTS

The principles of the Colorado poultry marketing contract outlined. Successful cooperation and successful business generally have proved these principles to be sound

POULTRY raisers on the Uncompahgre project, Colorado, realize more and more strongly that in cooperative marketing lies the solution of their problems. Accordingly, the Montrose County organization committee is planning a campaign in order to get poultry raisers on the project to sign the Colorado poultry marketing contract. Meetings are being held at various schoolhouses over the project, and it is believed that if the poultry producers organize under such contracts better results will be obtained by them in marketing their products. The present plans contemplate the formation of local associations in Montrose, Olathe, Delta, Hotchkiss, Paonia, and Cedaredge. These associations will then be affiliated into a district organization which will be a branch of the State poultry exchange.

The following series of questions and answers concerning the poultry exchange will be of interest to poultry raisers on other projects who are endeavoring to meet their present difficulties.

1. *What is the purpose of the poultry exchange?*

To secure for the members a fair price for poultry and poultry products—cost of production plus a reasonable profit.

2. *How will the Colorado Poultry Exchange be able to secure more for my products?*

First, by cutting out speculation and waste.

Second, by securing more of the consumer's dollar through reducing the "spread" between the farmers and the consumer.

Third, by standardizing the quality of Colorado poultry products and turning the premium secured over to the grower. Remember that cooperative nonprofit associations conduct their business on a cost basis. Standardization also reduces the risk in selling, thereby actually reducing the cost of getting products from the farmer to the consumer.

Fourth, by increasing the demand for your poultry products standardized and marketed under the "association brand," through advertising to widen markets and intensify demand. Overproduction is frequently only a matter of stimulating consumption to the point of absorbing the surplus. Farmers have proved this through their own cooperative associations. Why suffer from this surplus which floods the market and lowers prices?

Fifth, by orderly marketing; that is, "feeding" the markets according to the demand instead of glutting or "dumping" products upon the markets. Orderly



The transformation from sagebrush to alfalfa

marketing brings a stable price—a benefit to farmers, consumers, and middlemen alike. It can be accomplished only by farmers themselves through organization on a State and National basis.

Organization coupled with orderly marketing enables the farmer to adapt production to market requirements to the highest degree, and to handle a surplus crop in such a way that it will not "flood" the market and depress the price.

In other words, through orderly marketing the price for poultry products depends upon the supply and demand situation at the market and not upon the surplus at home. It is not to be inferred that this means withholding products from the market or control for the purpose of securing or maintaining an arbitrary or monopoly price, but only to bring about systematic "feeding" of the markets.

Orderly marketing prevents alternate glutting and starving of the markets, makes for a stable price, and handles the surplus in an orderly manner instead of permitting it to demoralize the market. Your marketing problems will never be solved until orderly marketing is accomplished. It can be brought about only by farmers through organization.

3. *Why should I join the poultry exchange?*

Because only through so doing can you ever hope to stabilize the price of your products.

Because a stable price enables you to plan your production and because it results in a satisfactory rural life.

Because it will bring you a fair price by—

Stabilizing the price through orderly marketing.

Cutting out speculation and waste.

Reducing the "spread" between farmer and consumer.

Securing a premium on your products sold under a registered brand.

Increasing the demand for poultry products through standardization and advertising, backed by sufficient volume of business through a State exchange to maintain the demand.

Because your products will be handled on a cost (nonprofit) basis.

Because through a State exchange you are in a position to cooperate with poultry growers in other States to effect a national solution of your poultry-marketing problem.

Remember that violent price fluctuations are due to farmers being unorganized.

Remember that glutting the markets is due to farmers being unorganized.

Remember that so long as competitive private middlemen buy your products at lowest possible prices, your marketing problem will never be solved.

Remember that the surplus product floods the markets and depresses prices.

Remember that orderly marketing or "feeding" the markets can never be accomplished by individual middlemen.

Remember that "commodity" cooperative marketing within the whole industry is the only way for farmers to secure stabilized prices and market products at less cost.

"I have always liked the RECLAMATION RECORD. I believe that I am going to like the NEW RECLAMATION ERA better than the old."—H. V. Favcett, Sidney, Mont., Lower Yellowstone project.

WHERE THE MONEY COMES FROM

THE following shows the sources of receipts to the reclamation fund and the amounts received during 1923:

1. PUBLIC LAND SALES

All moneys received from the sale and disposal of public lands in Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, and Wyoming, beginning with the fiscal year ending June thirtieth, nineteen hundred and one, including the surplus of fees and commissions in excess of allowances to registers and receivers, and excepting the five per centum of the proceeds of the sales of public lands in the above States set aside by law for educational and other purposes, shall be and the same are hereby reserved, set aside, and appropriated as a special fund in the Treasury to be known as the "reclamation fund."—Reclamation act of June 17, 1902 (32 Stat. 388.)

Under the foregoing the reclamation fund receives the bulk of the moneys from public land sales. The percentage varies, but roughly approximates 75 per cent at this time.—C. L. Bullion, Chief, Account Section, General Land Office.

During the calendar year 1923 the reclamation fund receipts from this source were about \$793,204.

2. TOWN LOT SALES

The Secretary of the Interior may withdraw from public entry any lands needed for town site purposes in connection with irrigation projects under the reclamation act * * * and subdivide the same into town lots * * *. The lots so surveyed shall be appraised under the direction of the Secretary of the Interior and sold * * *. Reclamation funds may be used to defray the necessary expenses of appraisal and sold and the proceeds of such sale shall be covered into the reclamation fund.—Act of April 16, 1906 (32 Stat. 116). See also acts of June, 27, 1906 (34 Stat. 519), and September 8, 1916 (39 Stat. 852).

The figures given in Bureau of Reclamation publications for accretions to the reclamation fund from this source are gross, i. e., the total proceeds of the town lot sales without any deduction for the expense of surveys, appraisal, sale, etc. During the calendar year 1923 the reclamation fund receipts in this way were about \$2,189.

3. POTASSIUM ACT RECEIPTS

The Secretary of the Interior is hereby authorized * * * to issue * * * a prospecting permit * * * to prospect for chlorides, sulphates, carbonates, borates, silicates, or nitrates of potassium

on public lands * * *. All leases to be conditioned upon the payment by the lessee of such royalty as may be specified in the lease * * *. All moneys received from royalties and rentals under the provisions of this act, except those from Alaska, shall be paid into, reserved, and appropriated as a part of the reclamation fund * * *.—Act of October 2, 1917 (40 Stat. 297).

In this case, as in that of town-lot sales, the reclamation fund receives 100 per cent, and during the year 1923 such receipts amounted to about \$3,099.

4. RECEIPTS UNDER FEDERAL WATER POWER ACT

A commission is hereby created and established, to be known as the Federal Power Commission * * *. The commission is hereby authorized and empowered * * * to issue licenses * * *. The licensee shall pay to the United States reasonable annual charges in an amount to be fixed by the commission for the purpose of reimbursing the United States for the costs of the administration of this act; for recompensing it for the use, occupancy, and enjoyment of its lands or other property, and * * * 50 per centum of the charges arising from licenses hereunder for the occupancy and use of public lands, national monuments, national forests, and national parks shall be paid into, reserved, and appropriated as a part of the reclamation fund.—Federal water power act of June 10, 1920 (41 Stat. 1063).

During the calendar year 1923 the reclamation fund receipts from this source amounted to about \$1,755.

5 AND 6. MINERAL LEASING ACT RECEIPTS

For past production 70 per centum and for future production 52½ per centum of the amounts derived from such bonuses, royalties, and rentals shall be paid into, reserved, and appropriated as a part of the reclamation fund.—Mineral leasing act of February 25, 1920 (41 Stat. 437).

During the calendar year 1923 the reclamation fund received, on account of past production, about \$35,805, and for future production about \$5,175,207.

7. PROJECT COLLECTIONS

This item includes a variety of things. The largest elements are the repayments of construction charges, operation and maintenance charges, water rental charges, and power sales. The reclamation operations include many other dealings resulting in collections by the Bureau of Reclamation, all of which are merged in this item, which during the calendar year 1923 aggregated about \$6,044,144.

TOTAL RECEIPTS

From all the above sources reclamation fund receipts during the calendar year 1923 aggregated about \$12,055,403.

Success can come to future Federal reclamation ventures only if projects are authorized upon a thoroughly scientific consideration of the probable power of the project to enable the farmer to repay construction costs and to win a living from the irrigated lands.

Community and political demand to secure projects should be considered only after full knowledge of the feasibility of a proposed project has been secured.



Huntley (Mont.) project sugar beets

RECENT FEDERAL IRRIGATION LEGISLATION

The appropriation act for the Bureau of Reclamation and other enactments concerning the irrigation of arid lands in the West, including investigations in a number of States

APPROPRIATIONS FOR 1925

An Act making appropriations for the Department of the Interior for the fiscal year ending June 30, 1925, and for other purposes. (Act June 5, 1924, Public No. 199, 43 Stat. —)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, for the Department of the Interior for the fiscal year ending June 30, 1925, namely:

OFFICE OF THE SECRETARY

* * * * *

For the purchase or exchange of professional and scientific books, law books, and books to complete broken sets, periodicals, directories, and other books of reference relating to the business of the department by the several offices and bureaus of the Interior Department herein named there is hereby made available from any appropriations made for such bureau or office not to exceed the following respective sums: * * * Bureau of Reclamation, \$1,500;

* * * * *

That the annual reports of the department and of all its bureaus and establishments, including the Bureau of Reclamation, shall not exceed a total of one thousand two hundred and fifty pages.

BUREAU OF INDIAN AFFAIRS

* * * * *

For continuing construction, maintenance, and operation of the irrigation systems on the Flathead Indian Reservation, in Montana, by and under the direction of the Commissioner of Indian Affairs, including the purchase of any necessary rights of property, \$150,000 (reimbursable).

For maintenance and operation of the irrigation systems on the Fort Peck Indian Reservation, in Montana, by and under the direction of the Commissioner of Indian Affairs, including the purchase of any necessary rights or property, \$15,000 (reimbursable).

For continuing construction, maintenance, and operation of the irrigation systems on the Blackfeet Indian Reservation in Montana, by and under the direction of the Commissioner of Indian Affairs, including the purchase of any necessary rights or property, \$20,000 (reimbursable).

* * * * *

For reclamation and maintenance charges on lands allotted to Paiute Indians within the Newlands project, Nevada, \$6,000; for payment of annual drainage assessments against said lands, \$2,100; in all, \$8,100, reimbursable from any funds of the said Indians now or hereafter available.

* * * * *

For reclamation and maintenance charges on Indian lands within the Yuma Reservation, California, and on ten acres within each of the eleven Yuma home-

stead entries in Arizona, under the Yuma reclamation project, \$60,000, reimbursable as provided by the Act of March 3, 1911 (Thirty-sixth Statutes at Large, page 1063).

* * * * *

For reimbursement to the reclamation fund the proportionate expense of operation and maintenance of the reservoirs for furnishing stored water to the lands in Yakima Indian Reservation, Washington, in accordance with the provisions of section 22 of the Act of August 1, 1914 (Thirty-eighth Statutes at Large, page 604), \$11,000.

BUREAU OF RECLAMATION

The following sums are appropriated out of the special fund in the Treasury of the United States created by the Act of June 17, 1902, and therein designated "the reclamation fund," to be available immediately:

For all expenditures authorized by the Act of June 17, 1902 (Thirty-second Statutes, page 388), and Acts amendatory thereof or supplementary thereto, known as the reclamation law and all other Acts under which expenditures from said fund are authorized, including salaries in the District of Columbia and elsewhere; examination of estimates for appropriations in the field; refunds for overcollections hereafter received on account of water-right charges, rentals, and deposits for other purposes; printing and binding, not exceeding \$30,000; purchase, maintenance, and operation of horse-drawn or motor-propelled passenger-carrying vehicles; payment of damages caused to the owners of lands or private property of any kind by reason of the operations of the United States, its officers or employees, in the survey, construction, operation, or maintenance of irrigation works, and which may be comprised by agreement between the claimant and the Secretary of the Interior; and payment for official telephone service in the field hereafter incurred in case of official telephones installed in private houses when authorized under regulations established by the Secretary of the Interior:

Salt River project, Arizona: For examination of project and project accounts, \$5,000;

Yuma project, Arizona-California: For operation and maintenance, continuation of construction, and incidental operations, \$765,000, of which not to exceed \$250,000 may be expended for the construction of a hydroelectric power plant at the syphon drop on the main canal: *Provided*, That no part of said sum of \$250,000 shall be expended until contracts have been entered into by a majority of the water-right applicants and entrymen, for the lands to be charged with the cost of said hydroelectric power plant in the manner provided by section 4 of the Reclamation Extension Act approved August 13, 1914 (Thirty-eighth Statutes at Large, page 686), wherein said water-right applicants and entrymen shall agree

to repay the cost of said power plant chargeable against their lands, in twelve equal annual instalments, commencing December 1, 1925;

Orland project, California: For operation and maintenance, continuation of construction, and incidental operations, \$40,000;

Grand Valley project, Colorado, including Orchard Mesa division: For operation and maintenance, continuance of construction, and incidental operations, \$465,000;

Uncompahgre project, Colorado: For operation and maintenance, continuation of construction, and incidental operations, \$150,000;

Boise project, Idaho: For operation and maintenance, continuation of construction, and incidental operations: *Provided*, That the expenditure for drainage shall not exceed the amount paid by the water users pursuant to the provisions of the Boise public notice dated February 15, 1921, except for drainage in irrigation districts formed under State laws and upon the execution of agreements for the repayment to the United States of the costs thereof, \$1,080,000: *Provided further*, That no part of the money appropriated under this paragraph shall be expended for the development of electric power until the Secretary of the Interior shall have secured, subject to the needs of the Boise project, a contract with the Gem Irrigation District, providing for the purchase by that district, for a period to be determined by the Secretary of the Interior, of the electric power necessary for the irrigation of the lands of said district: *And provided further*, That the rates in such contract shall be sufficient to include interest at five per centum per annum on the cost of such power development plus a reasonable depreciation on the power plant, as found by the Secretary of the Interior, and that the contract shall provide that before delivery of power in any season the district shall furnish security satisfactory to the Secretary of the Interior to insure payment to the Government of the power charges for such season, and that such contract shall be entered into only in the event that the holders of not less than ninety per centum of the face value of the bonded and warrant indebtedness of the district shall subordinate their claims to the obligations of the district to the Government under such contract: *And provided further*, That in the event power is furnished from the said power plant to more than one contractor, then the rates for power shall be fixed so that each such contractor, including said district, shall pay only its proper proportionate share of said interest and depreciation, as found by the Secretary of the Interior;

King Hill project, Idaho: For operation and maintenance, continuation of construction, and incidental operations, \$40,000;

Minidoka project, Idaho: For operation and maintenance, continuation of construction, and incidental operations,

(Continued on page 114)

FEDERAL IRRIGATION LEGISLATION

(Continued from page 113)

\$1,045,000: *Provided*, That no part of this appropriation (and no part of any unencumbered balance of the 1924 appropriation for the Minidoka project) shall be expended on the American Falls Reservoir until (1) all acts have been performed that are necessarily precedent to the confirmation of title in fee in the United States for said reservoir of such Indian lands as are essential to the construction of the same; (2) companies and districts which have contracted to co-operate with the United States in the construction of said reservoir and have contracted to participate in said reservoir to an aggregate amount of at least three hundred and sixty-five thousand acre-feet shall have paid to the United States their due proportionate share of all moneys expended by the United States on said reservoir prior to the date of said payments, including interest at the rate of 6 per centum per annum from the time such moneys were advanced by the United States; (3) The American Falls Reservoir district and the Empire Irrigation district shall each have filed with the Secretary of the Interior an agreement binding each of said districts to the elimination of the second paragraph of article 46 of their respective contracts of June 15, 1923, with the United States; and (4) the said companies and districts shall have paid to or deposited with the United States cash or United States Government securities amounting to a total of at least \$1,500,000: *Provided further*, That no contractor shall secure a right to the use of water from said reservoir except under a contract containing the provision that the contractor shall, as a part of the construction cost, pay interest at the rate of 6 per centum per annum upon the contractor's proper proportionate share, as found by the Secretary of the Interior, of the moneys advanced by the United States on account of the construction of said reservoir prior to the date of the contract;

Huntley project, Montana: For operation and maintenance, continuation of construction, and incidental operations, \$150,000;

Milk River project, Montana: For operation and maintenance, continuation of construction, and incidental operations, \$315,000;

Sun River project, Montana: For operation and maintenance, continuation of construction, and incidental operations, \$150,000;

Lower Yellowstone project, Montana-North Dakota: For operation and maintenance, continuation of construction, and incidental operations, \$95,000;

North Platte project, Nebraska-Wyoming: For operation and maintenance, continuation of construction, and incidental operations, \$1,450,000;

Newlands project, Nevada: For operation and maintenance, continuation of construction, and incidental operations, \$400,000, of which amount \$245,000 shall be used for drainage purposes, but only after execution by the Truckee-Carson irrigation district of an appropriate reimbursement contract satisfactory in form to the Secretary of the Interior, and after confirmation of such contract by decree of a court of competent jurisdiction and final decision on all appeals from such decree;

Carlsbad project, New Mexico: For operation, maintenance, and incidental operation, \$50,000;

Rio Grande project, New Mexico-Texas: For operation and maintenance, continuation of construction, and incidental operations, \$706,000;

Williston project (formerly North Dakota pumping project), North Dakota: For operation, maintenance, and incidental operations, \$100,000;



Registered draft stallion on the Minidoka project, Idaho

Baker project, Oregon: For investigation, commencement of construction, and incidental operations, the unexpended balance of the appropriation for this purpose for the fiscal year 1924 is reappropriated and made available for the fiscal year 1925;

Umatilla project, Oregon: For operation and maintenance, continuation of construction, and incidental operations, \$940,000;

Klamath project, Oregon-California: For operation and maintenance, continuation of construction, and incidental operations, \$695,000;

Belle Fourche project, South Dakota: For operation and maintenance, continuation of construction, and incidental operations, \$185,000;

Strawberry Valley project, Utah: For operation and maintenance, continuation of construction, and incidental operations, \$40,000;

Okanogan project, Washington: For operation and maintenance, continuation of construction, and incidental operations, \$70,000;

Yakima project, Washington: For operation and maintenance, continuation of construction, and incidental operations, \$720,000;

Riverton project, Wyoming: For operation and maintenance, continuation of construction, and incidental operations, \$650,000;

Shoshone project, Wyoming: For operation and maintenance, continuation of

construction, and incidental operations, \$475,000;

Secondary projects: For cooperative and miscellaneous investigations, \$50,000;

For the continued investigation of the feasibility of irrigation, water storage, and related problems on the Colorado River, and investigation of water sources of said river, \$25,000;

Under the provisions of this Act no greater sum shall be expended, nor shall the United States be obligated to expend, during the fiscal year 1925, on any reclamation project appropriated for herein, an

amount in excess of the sum herein appropriated therefor, nor shall the whole expenditures or obligations incurred for all of such projects for the fiscal year 1925 exceed the whole amount in the "reclamation fund" for that fiscal year;

Ten per centum of the foregoing amounts shall be available interchangeably for expenditures on the reclamation projects named; but not more than 10 per centum shall be added to the amount appropriated for any one of said projects, except that should existing works or the water supply for lands under cultivation be endangered by floods or other unusual conditions, an amount sufficient to make necessary emergency repairs shall become available for expenditure by further transfer of appropriation from any of said projects upon approval of the Secretary of the Interior;

Whenever, during the fiscal year ending June 30, 1925, the Commissioner of the Bureau of Reclamation shall find that the expenses of travel, including the local transportation of employees to and from their homes to the places where they are engaged on construction or operation and maintenance work, can be reduced thereby, he may authorize the payment of not to exceed three cents per mile for a motor cycle or seven cents per mile for an automobile used for necessary official business;

Total, from Reclamation fund, \$10,856,000.

(Continued on page 115)

FEDERAL IRRIGATION LEGISLATION

(Continued from page 114)

RECLAMATION PROVISIONS OF APPROPRIATION ACT FOR DEPARTMENT OF AGRICULTURE

An Act making appropriations for the Department of Agriculture for the fiscal year ending June 30, 1925, and for other purposes. (Act June 5, 1924, Public No. 201, 43 Stat. —)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, for the Department of Agriculture for the fiscal year ending June 30, 1925, namely:

* * * * *

For investigations in connection with western irrigation agriculture, the utilization of lands reclaimed under the Reclamation Act, and other areas in the arid and semiarid regions, \$93,175;

* * * * *

To enable the Secretary of Agriculture to encourage and aid in the agricultural development of the Government reclamation projects; to assist, through demonstrations, advice, and in other ways, settlers on the projects; and for the employment of persons and means necessary in the city of Washington and elsewhere, \$36,460.

* * * * *

INDIAN LANDS FOR AMERICAN FALLS RESERVOIR

An Act authorizing the acquiring of Indian lands on the Fort Hall Indian Reservation, in Idaho, for reservoir purposes in connection with the Minidoka irrigation project. (Act May 9, 1924, Public, No. 116, 43 Stat. —)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That subject to payment being made as provided herein, there is hereby granted to the United States, its successors and assigns, for the proposed American Falls Reservoir

on the Snake River under the Minidoka Federal irrigation project, in Idaho, all right, title, and interest the Indians have to the tribal and allotted lands within that section of the Fort Hall Indian Reservation commonly referred to as the Fort Hall Bottoms, which lands will be inundated by the impounding of one million seven hundred thousand acre-feet of water within said proposed reservoir, together with a five-foot freeboard the elevation of which shall be established, using as a basis the one million five hundred thousand acre-foot contour line as shown in what is known as the Dyer-Dietz-Banks appraisal of Indian lands dated December 30, 1922, and on file in the Department of the Interior subject to the reservation of an easement to the Fort Hall Indians to use the said lands for grazing, hunting, fishing, and gathering of wood, and so forth, the same way as obtained prior to this enactment, in so far as such uses shall not interfere with the use of said lands for reservoir purposes.

SEC. 2. That the Secretary of the Interior be, and he is hereby, authorized to acquire by agreement or condemnation proceedings the area of allotted lands described in section 1. The value fixed by agreement with the allottees, and in any case where it may become necessary to institute condemnation proceedings for such purpose, the value of the allotment or allotments involved as determined by such proceedings, shall be paid out of the sum deposited to the credit of the Fort Hall Indians as provided in section 3 hereof.

SEC. 3. That in consideration of the rights granted in section 1 hereof, of both tribal and allotted lands, there shall be deposited in the Treasury of the United States to the credit of the Fort Hall Indians the total sum of \$700,000, which sum shall be taken from moneys appropriated for the construction of said reservoir: *Provided*, That the said sum of \$700,000, when so deposited, shall draw interest at the rate of 4 per centum per annum.

SEC. 4. Should any lands above the five-foot freeboard, as provided in section

1, be damaged on account of the reservoir, the amount of the damage shall be determined by a board consisting of three members—two of which shall be appointed by the Secretary of the Interior—one from the Bureau of Indian Affairs, and one from the Bureau of Reclamation, the third member, who shall be a disinterested party, to be selected by the two so appointed. The amount of damage as fixed by the board shall be taken from moneys appropriated for the construction of said reservoir and deposited in the Treasury of the United States to the credit of the Fort Hall Indians.

SEC. 5. That there is hereby authorized to be appropriated not to exceed \$100,000 of the money when deposited to the credit of the Fort Hall Tribe of Indians for use in relocating, enlarging, and reconstructing the main canal of the Fort Hall irrigation project to provide irrigation facilities for Indian lands situated in the southern portion of the Fort Hall Reservation, commonly known as the Michaud Flats, which amount so expended shall be reimbursed to the tribe by the Indians whose lands are benefited, on a per acre basis in accordance with such rules and regulations as the Secretary of the Interior may prescribe: *Provided*, That in all cases where the Indian title becomes extinguished prior to total reimbursement of the sum assessed against any particular allotment, the party acquiring title to such allotment shall be required to execute an agreement before any water will be furnished therefor, providing for the payment of construction charges assessed against such lands, and for the payment of the annual operation and maintenance charges.

INVESTIGATIONS ON THE RIO GRANDE

An Act providing for a study regarding the equitable use of the waters of the Rio Grande below Fort Quitman, Texas, in cooperation with the United States of Mexico. (Act May 13, 1924, Public No. 118, 43 Stat. —)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the President is hereby authorized to designate three special commissioners to cooperate with representatives of the United States of Mexico in a study regarding the equitable use of the waters of the Rio Grande below Fort Quitman, Texas, with a view to their proper utilization for irrigation and other beneficial uses. One of the commissioners so appointed shall be an engineer experienced in such work. Upon completion of such study the results shall be reported to Congress.

SEC. 2. The sum of \$20,000 is hereby authorized to be appropriated out of any moneys in the Treasury not otherwise appropriated for carrying out the provisions hereof.

COOPERATIVE IRRIGATION INVESTIGATIONS IN WYOMING, OREGON, AND CALIFORNIA

Joint Resolution authorizing an investigation of the proposed Casper-Alcova irrigation project, Natrona County, Wyo.; the Deschutes project in the State of Oregon, and the Southern Lassen irrigation project in Lassen County, Calif. (Senate Joint Resolution of June 7, 1924, No 114, 43 Stat. —)

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the

(Continued on page 116)



Furrow irrigation on the Salt River project, Arizona

OPTIMISM REFLECTED IN UNCOMPAHGRE POEM

The Delta (Colo.) Independent, in its issue of April 18, contains the following optimistic expression, in the form of a poem, of the belief of Minnie E. Blake in the future of the Uncompahgre project:

THE RECLAMATION RANCHER

I'm balked, I admit, and I'm down and out,

But you notice I'm not defeated;
For there lurks in my soul not a hint of a doubt

That this project will be completed.

The croakers declared that it couldn't be reeled,

But I laughed at the fool assumption;
For who but has seen the impossible yield
To the fellow with wit and gumption.

I'm up you perceive, and I'm on my feet,
And that's not a bad beginning;
And I've faith to win as I had to begin,
For I'm in the habit of winning.

Then write the thing down, and write it so plain

That the croaker who runs may read it,
He'll make it a go, for he's at it again.

A fig for the fates that impede it!

—Minnie E. Blake, Montrose.

ENCOURAGE TREE PLANTING

AS a suggestion for an article in the New RECLAMATION ERA, A. F. Galloway, of Fort Morgan, Colo., says: "I think a persistent effort should be made by the ERA to encourage tree planting." The New RECLAMATION ERA is particularly glad to do this and believes no better beginning could be made than by quoting from Mr. Galloway's letter:

"Every project served by the Reclamation Service was originally a treeless plain. There is no possible outlay of time and money that can add to the value, the attractiveness of the country, protect it from winds, cold, and sun, and contribute to the comfort of its people as the planting of trees has always done and always will do.

"A farm without trees is a place to work, but never a home. A family that will plant and properly care for trees is the family which a community can not afford to lose. People who plant trees are not apt to be a migratory class.

"The barrenness of new countries, due to the absence of timber, is the outstanding reason why so many people become discontented, homesick, and leave for

other localities. The need of trees on every new project is greater than it is for white houses and big red barns and other improvements. Money can provide all of these improvements at any time, but money can not buy a tree, and its value is above a cash consideration.

"Time, care, intelligence, an appreciation of beauty and comfort—these are among the requisites in tree culture. Talk to your readers about the imperative need of trees about the home. Without the influence of trees our literature, our earliest recollections, our home life, our religion would be barren. Deprive for a few generations a people of the inspiration trees have brought to mankind, and barren lives are sure to be the result.

"Tell the people to plant trees, and then more trees. With irrigation established, timber may be quickly and profitably grown.

"Secretary Work was a resident of this county for a number of years and knows something of the conditions which are unfavorable to tree culture, but we are succeeding in the face of all obstacles.

"Tell the people to plant trees."

FEDERAL IRRIGATION LEGISLATION

(Continued from page 115)

Secretary of the Interior be, and he is hereby, authorized and directed to prepare and submit to Congress at the beginning of the next regular session plans and estimates of the character and cost of structures necessary for the construction and completion of the proposed Casper-Alcova irrigation project in Natrona County, Wyo., the Deschutes project in the State of Oregon, and the Southern Lassen irrigation project, in Lassen County, Calif.: *Provided*, That at least one-half of the cost of all such investigations, plans, and estimates shall be advanced by the State in which the project is located, or by parties interested.

CONGRESSIONAL INVESTIGATION OF TRI-COUNTY IRRIGATION PROJECT IN NEBRASKA

Resolution authorizing the Committee on Irrigation and Reclamation to appoint a subcommittee to visit during the vacation the tri-county project in Nebraska and report to the full committee on the practicability of the same. (Senate Resolution of June 7, 1924, No. 251, 43 Stat. —)

Whereas in the Sixty-seventh Congress, a Senate joint resolution (S. J. Res. 215) was approved September 22, 1922, as follows:

"*Resolved by the Senate and House of Representatives of the United States of America in Congress assembled*, That the

Secretary of the Interior, upon the payment to him in advance of the necessary funds to defray the expenses thereof, be, and he is hereby, authorized to make an additional investigation of the tri-county project in Nebraska, comprising the counties of Gosper, Phelps, and Kearney, in said State, and to extend said investigation into Adams County, Nebraska, with a view of ascertaining whether it is practicable to convey for irrigation purposes flood waters from the Platte River onto lands in said counties";

And

Whereas in accordance with such resolution a survey of said tri-county project in Nebraska has been made by the Bureau of Reclamation, and the expenses of such survey and investigation amounting to more than \$15,000 have been paid for by the State of Nebraska and the citizens living in the vicinity of said project: Now, therefore, be it

Resolved, That the Committee on Irrigation and Reclamation be authorized to appoint a subcommittee to visit the tri-county project in Nebraska during the recess of Congress and report to the full committee on the practicability of said project and the advisability of installing the same. There is hereby appropriated out of the contingent fund of the Senate, the sum of \$300 for the purpose of defraying the expenses of said investigation.

DRAINAGE FOR INDIAN LANDS ON NEWLANDS IRRIGATION PROJECT

An Act to amend an Act entitled "An Act authorizing an appropriation to meet proportionate expenses of providing a drainage system for Piute Indian lands in the State of Nevada within the Newlands reclamation project of the Reclamation Service," approved February 14, 1923. (Act of June 7, 1924, Public No. 231, 43 Stat. —.)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Act entitled "An Act authorizing an appropriation to meet proportionate expenses of providing a drainage system for Piute Indian lands in the State of Nevada within the Newlands reclamation project of the Reclamation Service," approved February 14, 1923, be, and the same is hereby, amended to read as follows:

"That there is hereby authorized to be appropriated, out of any money in the Treasury not otherwise appropriated, the sum of \$49,603.05, payable in twenty annual installments of \$2,500 each, except the last, which shall be the amount remaining unpaid; for the purpose of meeting the proportionate expense of providing a drainage system for four thousand eight hundred and eighty-seven acres of Piute Indian lands in the State of Nevada within the Newlands project of the Reclamation Service.

"The money herein authorized to be appropriated shall be reimbursed in accordance with the provisions of law applicable to said Indian lands."

ADMINISTRATIVE ORGANIZATION FOR THE BUREAU OF RECLAMATION

HON. HUBERT WORK, SECRETARY OF THE INTERIOR

E. C. Finney, First Assistant Secretary; F. M. Goodwin, Assistant Secretary;

John H. Edwards, Solicitor for the Interior Department; E. K. Burlew, Administrative Assistant to the Secretary; J. H. McNeely, Assistant to the Secretary;
John Harvey, Chief Clerk

Washington, D. C.

Elwood Mead, Commissioner, Bureau of Reclamation

Miss Mae A. Schnurr, secretary to the commissioner

J. B. Beadle, Chief Clerk

Denver, Colorado, Wilda Building

F. E. Weymouth, Chief Engineer

R. F. Walter, Drainage Engineer

F. T. Crowe, General Superintendent of Construction

J. L. Savage, Designing Engineer

Barry Dibble, Electrical Engineer

Geo. C. Kreutzer, Director of Farm Economics

B. E. Hayden, Industrial Agent

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Harry Caden, Fiscal Agent

D. W. Davis, Director of Finance

H. L. Holgate, Chief Field Counsel

R. M. Patrick and Armand Offutt, District Counsel

W. F. Kubach and W. A. Meyer, Fiscal Inspectors

Project	Office	Superintendent	Chief clerk	Fiscal agent	District counsel	
					Name	Office
Belle Fourche.....	Newell, S. Dak.....	F. C. Youngblutt.....	R. C. Walber.....		Brooks Fullerton.....	Mitchell, Nebr.
Boise.....	Boise, Idaho.....	J. B. Bond.....	E. R. Mills.....	C. F. Weinkauff.....	B. E. Stoutemyer.....	Boise, Idaho.
Carlsbad.....	Carlsbad, N. Mex.....	L. E. Foster.....	V. L. Minter.....	V. L. Minter.....		
Grand Valley.....	Grand Junction, Colo.....	S. O. Harper.....	W. J. Chiesman.....	C. E. Brodie.....	J. R. Alexander.....	Montrose, Colo.
Huntley.....	Ballantine, Mont.....	A. R. McGinness.....	J. P. Siebenelcher.....	Miss M. C. Simek.....	E. E. Roddis.....	Helena, Mont.
King Hill.....	King Hill, Idaho.....	G. H. Harris.....	E. V. Hillius.....	E. V. Hillius.....	B. E. Stoutemyer.....	Boise, Idaho.
Klamath.....	Klamath Falls, Oreg.....	H. D. Newell.....	N. G. Wheeler.....	G. R. Barnhart.....		
Lower Yellowstone.....	Savage, Mont.....	H. A. Parker.....	E. R. Scheppelemann.....		E. E. Roddis.....	Helena, Mont.
Milk River.....	Malta, Mont.....	G. E. Stratton.....	E. E. Chabot.....	G. S. Moore.....	do.....	Do.
Minidoka.....	Burley, Idaho.....	E. B. Darlington.....	E. C. Diehl.....	Miss A. J. Larson.....	B. E. Stoutemyer.....	Boise, Idaho.
Newlands.....	Fallon, Nev.....	J. F. Richardson.....	G. B. Snow.....	Miss E. M. Simmonds.....	P. W. Dent.....	San Francisco, Calif.
North Platte.....	Mitchell, Nebr.....	Andrew Weiss.....	L. H. Mong.....	V. E. Hubbell.....	Brooks Fullerton.....	Mitchell, Nebr.
Okanogan.....	Okanogan, Wash.....	Calvin Casteel.....	W. D. Funk.....	W. D. Funk.....		
Orland.....	Orland, Calif.....	R. C. E. Weber.....	C. H. Lillingston.....	C. H. Lillingston.....	P. W. Dent.....	San Francisco, Calif.
Rio Grande.....	El Paso, Tex.....	L. M. Lawson.....	C. A. Peavey.....	L. S. Kennicott.....		
Riverton.....	Riverton, Wyo.....	H. D. Comstock.....	R. B. Smith.....	Henry Berryhill.....	Brooks Fullerton.....	Mitchell, Nebr.
Salt River ¹	Phoenix, Ariz.....	C. C. Cragin ²				
Shoshone.....	Powell, Wyo.....	I. B. Hosig (acting).....	W. F. Sha.....	Mrs. O. C. Knights.....	E. E. Roddis.....	Helena, Mont.
Strawberry Valley.....	Provo, Utah.....	W. L. Whittemore.....	H. R. Pasewalk.....	W. C. Berger.....	J. R. Alexander.....	Montrose, Colo.
Sun River.....	Great Falls, Mont.....	G. O. Sanford.....	H. W. Johnson.....	F. C. Lewis.....	E. E. Roddis.....	Helena, Mont.
Umatilla.....	Hermiston, Oreg.....	H. M. Schilling.....	G. C. Patterson.....	Miss M. G. Valentine.....		
Uncompahgre.....	Montrose, Colo.....	L. J. Foster.....	G. H. Bolt.....	F. D. Helm.....	J. R. Alexander.....	Montrose, Colo.
Williston.....	Williston, N. Dak.....	W. S. Arthur.....	W. S. Arthur.....	H. C. Melaas.....	E. E. Roddis.....	Helena, Mont.
Yakima.....	Yakima, Wash.....	J. L. Lytel.....	R. K. Cunningham.....	J. C. Gawler.....		
Yuma.....	Yuma, Ariz.....	P. J. Preston.....	C. A. Denman.....	E. M. Philebaum.....	P. W. Dent.....	San Francisco, Calif.

Large Construction Works

Minidoka, American Falls.....	American Falls, Idaho.....	F. A. Banks ³	H. N. Bickel.....	O. L. Adamson.....	B. E. Stoutemyer.....	Boise, Idaho.
Umatilla, McKay Dam.....	McKay Dam, Oreg.....	R. M. Conner ⁴	C. B. Funk.....	W. S. Gillogly.....		
Yakima, Tieton Dam.....	Rimrock, Wash.....	Walter Ward ¹	V. G. Evans.....	C. F. Williams.....		

¹ Project operated by Salt River Valley Water Users' Association.

² General Superintendent and Chief Engineer.
³ Construction Engineer

⁴ Superintendent of Construction.

The NEW RECLAMATION ERA is issued every month by the Bureau of Reclamation of the Department of the Interior, Washington, D. C. It is printed by the Government Printing Office, Washington, D. C.

The NEW RECLAMATION ERA is sent regularly to all water users on the reclamation projects under the jurisdiction of the bureau who wish to receive the magazine. To other than water users the subscription price is 75 cents per year, payable in advance. Subscriptions should be sent to the Chief Clerk, Bureau of Reclamation, Washington, D. C., and remittance in the form of postal money order or New York draft should be made payable to the Chief Disbursing Clerk, Department of the Interior. Postage stamps are not acceptable in payment of subscription.

HUGH A. BROWN, EDITOR

THE DEVELOPMENT of pioneer communities under irrigation has shown that an irrigation community may grow more readily if it extends from the original area of settlement by way of the easy stages. When an irrigation venture is established near an older irrigation settlement, there is a greatly increased possibility of early success. If an irrigation venture is established far from any other community of the kind it will be under many handicaps, especially if the climatic, soil, and social environment is not as favorable as that prevailing in the older settlement. In any case, the climatic, soil, and economic environment will determine the success of an irrigation enterprise.

NEW RECLAMATION ERA

VOL. 15

AUGUST, 1924

NO. 8



SNOW-CAPPED PEAKS FURNISH WATER FOR THE IRRIGATION PROJECTS



NEW RECLAMATION ERA

Issued monthly by the Bureau of Reclamation, Department of the Interior, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 15

AUGUST, 1924

No. 8

DETAILED SURVEY OF RECLAMATION PROJECTS PLANNED

Information expected to be available for the opening session of Congress in December.—In addition, field investigations of five new projects to be made during summer

A SURVEY of Government reclamation projects for the purpose of classifying the soils, determining the financial condition of the water users, fixing the irrigable areas against which charges may be assessed will be made by the Bureau of Reclamation in accordance with the recommendations of the special advisory committee's report.

In addition, field investigations of five new projects will be made during the summer. They include the proposed Owyhee project in Oregon, the Vale project in Oregon, the Salt Lake Basin in Utah, the Spanish Springs in Nevada, and the Kittitas in Washington. A new plan has been adopted by the Bureau of Reclamation with reference to the final recommendations on these new projects. It provides for the appointment of a committee made up of one member of the bureau, one recognized authority in farm management—preferably from the Department of Agriculture or the State agricultural college—and one financial authority—preferably a banker in whom the State has confidence—to consider the facts and data collected. After considering them this committee will fix the costs of development, the probable value of products which can be grown, the conditions under which settlement ought to be made in order to render the project feasible, or, if the conditions are unfavorable, will state that the project is not feasible.

The surveys will cover every phase and it is hoped the information will be available for submission to Congress at the opening of its session in December. The plan of these surveys follows:

Classification of land.—A soil survey shall be made, and all irrigable lands classified according to their productive capacity, in not exceeding four classes. No land shall be excluded from such classification unless it clearly appears that it is incapable of successful irrigation.

Financial condition of water users.—A census shall be taken on this subject upon blanks in form approved by the commis-

sioner. Such census shall be for the purpose of ascertaining the assets and liabilities of each water user with the view of proposing a plan for refunding the indebtedness of individual water users, other than amounts owing to the United States as project charges, at lower interest rates and on more favorable terms otherwise.

Irrigable areas.—The report shall show in each case what irrigable areas may be depended upon to return the charges assessable against them, and what must be excluded from further consideration. This shall be made as specific as feasible. If any additional areas may be irrigated from the project, a report shall be made thereon.

Drainage.—Careful consideration shall be given to present and prospective drainage needs, and the relation of this subject to the ability of the farmers to pay the cost.

WATER USERS IN INDIA AIDED BY GOVERNMENT

If our own experience is not sufficient we ought to study the conclusions reached by other irrigated countries where land settlement is carried out by the Government. Within the last 50 years the money spent on irrigation works by the Government of India has run into hundreds of millions of dollars. These works are built in an irrigated country with experience and traditions in irrigation practice, which make agricultural development a much simpler matter than it is here, though we have advantages in the greater energy and ambition of our people. The significant fact of recent Indian development is the inclusion, in the estimates of cost, of money for aid and advice given settlers in the preparation and improvement of their farms. They have come to believe that money thus spent is of as great importance as that spent on any element necessary to make a developed farm.—Report of Committee of Special Advisers on Reclamation.

Refractory lands.—The topography and soil of the irrigable area of each project shall be studied, and report made as to any area particularly difficult from any cause to prepare for irrigation, in order that it may be decided whether it would be feasible for the Government to assist settlers in preparing such lands for use.

Excess land holdings.—All excess irrigable land holdings shall be listed, with a showing in each case as to whether the provisions of section 3 of the act of August 9, 1912 (37 Stat. 265), are being observed.

Vacant lands.—All irrigable vacant lands shall be reported with the reasons why the same are not being irrigated.

Agricultural advice.—The report shall include a statement upon this subject as to each project, showing what, if any, benefit to the Government investment may be secured through the giving by the Government of expert agricultural and economic advice to the farmers, including an outline of a practical plan of procedure.

Improvement of general conditions.—Recommendations shall be made as to each project on the matter of improving general project conditions, as distinguished from individual conditions, through the establishment of creameries, sugar-beet factories, etc.

Ultimate losses.—This subject shall be exhaustively reported, and clear and convincing showings made thereon. The full assets and liabilities of each project shall be carefully set out in detail. The subject shall be treated both from a purely legal standpoint and from an equitable standpoint.

Transfer of operation and maintenance.—The feasibility of transferring to the water users in the near future the operation and maintenance of each project or division of a project shall be discussed in the report.

Recommendations.—There shall be attached to the report on each project recommendations as to what action should be taken to bring the project to a prosperous and successful condition.

FARM CREDIT AND ADVICE ON RECLAMATION PROJECTS

Commissioner Mead, at a recent conference in Denver, points out that the agricultural adviser must have authority to enforce certain things essential to the common welfare

WITH the exception of the United States no government is building and operating irrigation works that does not include agricultural advice and direction with agricultural credit. They go together. The credit is unsafe unless it is accompanied by the very best kind of ability to watch both the expenditure and the person affected. That means the exercise of a certain amount of authority; it has to go with it. Just as you can not operate an irrigation work and let every man take water when he pleases or close down or open gates when he pleases. There must be authority. We should recognize more and more that an irrigation project is an organic unit in which we must have certain regulation and speeding up of activities.

To show how necessary and valuable that is, take, for example, the decision in California to exclude tubercular cattle in the State settlements. That could not be done by any private project because of lack of authority. It is impossible for an individual, except at a tremendous cost, to maintain a tubercular-free herd in a community that is under no sort of supervision; but it is possible, where a large area of land lies in a unit, to say at the start that no animal will be permitted to come in unless it has been tested and

that no animal will be permitted to stay if later on it develops tuberculosis. You can not do that by trusting to individual action or to action by the settlers. You must treat those things as you would health regulations—as something necessary to the general welfare and to be imposed to protect the general welfare. If you leave it to the individual, one man who is an extreme individualist will insist on having tubercular stock to show that he is different and can do as he pleases, and he will contaminate the whole area.

We wanted in the first place to have all the advantages set forth and to get the settlers to do voluntarily what was necessary, but when it came to selling their stock and making some sacrifice, it was a different thing. If we had not been able to exercise power, the whole thing would have gone to pieces. Now, what happened in the second settlement? We knew that an individual coming in there was not in a position to make a wise decision, so we said, "Any man who wants to keep tubercular cows can go somewhere else." We made it a condition to his entering the settlement to agree to that regulation, just as we would make him agree to building regulations in a city.

A time came when there was a test of

animals. Every animal had been bought under test and was supposed to be a tubercular-free animal, but when the time for testing came around there were a really disastrous number of tubercular animals. I had been out on the farm of a settler and he had pointed out to me the fact that he had several registered cows. He told me about the struggle he had been making to get started; that now he had this herd and his income was all right. He showed me where he was going to build an addition to his house and a new wing on his barn. But the test showed that seven of his milking herd were tubercular, and four of these were registered animals. We do not have any compensation out there at all. There was a total loss. The tremendous sacrifice that that meant to him was brought home to me as much as if it had been my own. I said to the superintendent, "Look here, I haven't the nerve to insist on this being enforced." "Well," he said, "it doesn't take any nerve. The settlers have come to realize the value of this so completely, they have such pride in the fact that they are a tubercular-free community, that you would destroy this settlement if you were to take that away."

A lot of things that people will resent before they come under their influence and see their value are the things that we have got to incorporate into the life of these districts if we are to make them what they can be made, both in money income and in social satisfaction.

We are realizing more and more that as the country gets more crowded we must think less of ourselves and more of the common welfare; and a part of our progress to-day is in losing a part of our freedom. The value of the adviser is in the fact that he is an integral part of the organization, that he does not simply go around and give the settlers what they are willing to take and let them go on as they please, but he enforces certain things essential to the common welfare and common property, just as the department enforces ditch regulations. In everything we do we are coming more and more to have to submit ourselves to regulations that were not necessary for the pioneer and yet without which we can not succeed.

"The NEW RECLAMATION ERA is the real thing for the dirt farmer."—W. F. Hoyer, Tieton, Wash., Yakima project.



Sorting apples on the Yakima project, Washington

CANADIAN POINTERS FOR RECLAMATION PROJECTS

In pursuance of a policy to assist and encourage agricultural development, legislation has been passed providing for a system of short and long term credits at reasonable interest rates

THE following summary of legislation providing for farm loans and rural credits in the Provinces of Canada is from a compilation prepared under the direction of the superintendent of the natural resources intelligence branch, of the Department of the Interior, Ottawa, Canada:

NOVA SCOTIA

Nova Scotia has no Crown lands suitable for agriculture. However, the Province has adopted legislation which provides loans to settlers for the purchase of privately owned land for agricultural purposes. In addition, the Department of Industries and Immigration assists prospective purchasers by offering the expert services of an official farm valuator and advice regarding the method of obtaining title to the property proposed to be purchased. Thus, in choosing a farm on which to settle, the purchaser derives the benefit of experience as to the class of soil, the locality, value, and how to obtain title, together with the privilege of borrowing a percentage of the purchase price from the Government.

This act is one of long standing and has warranted its existence by proving of great advantage to the new settler in Nova Scotia. Its provisions may be set down briefly as follows:

1. To a settler who borrows from a loan company to the extent of 40 per cent of the appraised value of the property he wishes to purchase, the Government will guarantee, in approved cases and to thoroughly experienced farmers, an additional loan of 40 per cent. The settler must, however, provide the other 20 per cent and must have the necessary capital for house furnishings, stock, implements, and maintenance for himself and family till a crop is obtained.

2. Security for a loan made under the act is provided by a first mortgage on the property purchased.

3. The rate of interest charged on the Government's loan varies from 6 to 7 per cent, according to the condition of the money market.

4. Principal and interest are repaid by the borrower in annual installments over a period of 15 years.

NEW BRUNSWICK

An act of the legislature in 1912 provides for the formation of a farm settlement board. The purposes of the board shall be to purchase land in the Province suitable for farming, to improve the land,

erect houses and farm buildings thereon, and to sell these improved lands to bona fide settlers.

Farms bought by the board are resold to settlers at cost, on the following terms:

An initial cash payment of 25 per cent of the purchase price is required on property costing less than \$1,000; where the cost is more than \$1,000 an initial payment of 35 per cent is required.

The remainder of the cost, with interest at 5 per cent per annum, is payable at such stated periods as the board may agree upon with the purchaser.

SOUTH AFRICA MEETS IRRIGATION TROUBLES

"Our irrigation works are very expensive, as we have very little permanent water and have to rely on storage dams to catch irregular floods. An approximate figure of cost would be about \$100 per acre. The cost has to be repaid over varying periods, usually between 20 and 60 years, with an average of about 40.

"At first two free years were allowed after completion of works, and then a full uniform rate became due.

"Two years ago we altered the act and allowed four years of reduced payments following the two free years, and now we are contemplating altering the four to eight.

"The land is nearly always in private ownership and usually in areas much bigger than the owners can work. In some cases a single owner holds as much as 4,000 acres. This has been the cause of all our troubles, and we are endeavoring to remedy them."—A. D. Lewis, Director of Irrigation, South Africa.

The final payment must be made not later than 10 years from the date of the agreement to purchase. In special cases an extension of two years may be granted, at the discretion of the board.

Farms suitable for settlement, together with every obtainable detail concerning them, are catalogued. Should a settler decide upon the purchase of a property, he must make application through the secretary of the board. An inspector, who is a member of the board, visits the land and reports with a recommendation as to value, etc. If the report be satisfactory, the property is bought by the

board and resold to the settler at cost, according to the terms of the act. The board retains the title deed, and the purchaser holds a deed of agreement until he has paid by periodical installments the debt he has incurred. A transfer of the property is then made to him.

Young men desiring to obtain property near their relatives may choose a vacant farm in the vicinity and apply for assistance, which the board is prepared to do everything in its power to render.

Should any purchaser fail to make the agreed payments as a result of willful negligence or endeavor to defraud, the farm is immediately taken over by the board. On the other hand, failures due to unfavorable circumstances outside the purchaser's control receive consideration and assistance.

ONTARIO

The agricultural development act of 1921 aims to provide facilities for obtaining money to invest in farm lands, and thus enable men of character and experience to secure a start upon reasonable terms. Loans may be made for the following purposes:

1. Acquiring land for agricultural purposes.
2. The erection of farm buildings essential to production.
3. To pay off charges existing against the land at the time of acquisition by the borrower under a will or by descent.
4. To pay off encumbrances, in which cases loans shall not exceed 40 per cent of the valuation.
5. For the purpose of providing tile drainage.

The board is authorized to make a loan up to 65 per cent of the value of the property taken as security. Character, ability, and experience are prerequisites. No loan shall exceed \$12,000 to any one person, and the rate of interest to be charged shall be 6 per cent.

The repayment of all loans is on the amortization plan; that is, the entire amount—principal and interest—is spread over a period of 20 years and is repaid by means of fixed annual payments of combined principal and interest; thus, for each \$1,000 borrowed, in order to discharge the debt in 20 years, the borrower is required to make an annual payment of \$87.18.

The act also enables any borrower to pay off as much of the loan as he may desire upon any interest date after the third year.

(To be continued)

SILO-FILLING TIME ON PROJECTS DEMANDS PREPARATION

Silos are a comparatively new feature of farm management, and in many cases have been built less substantially than some of the older forms of farm structures, says Department of Agriculture

WITH the approach of the time for filling the silo attention is called to the desirability of putting silos in shape and making plans for filling which will save valuable time in the rush of work.

Even the best constructed silo will need some attention occasionally. Concrete silos require the least attention as a general rule, but they will give better service if the inside is given a coat of

The corn ordinarily is hauled to the cutter on common, flat hayracks. The low-wheeled wagon is much preferable to the high one. An underslung rack can be constructed with comparative ease and will save much labor. The rack consists of two 4 by 6 inch bed pieces, 18 or 20 feet in length, bolted together at the end to form a V. On top of these timbers is built a rack 6 feet in width. The bottom

of this rack is about 8 feet long. The end boards are 4 feet high, built flaring so they do not quite touch the wheels.

The apex of the V is suspended below the front axle of an ordinary farm wagon by means of a long kingbolt. The other ends are attached below the hind axle by U-shaped clevises. The materials needed in its construction are 80 board-feet of 4 by 6 inch plank, 96 feet of boards 1 by 12 inches, and 22 feet of lumber 2 by 4 inches, one long kingbolt, two stirrup rods, and bolts and nails.

If the silage cutter and lifting machinery have been selected, every effort should be made to get machinery which has sufficient or excess capacity. The mistake is often made of getting an outfit that is too small, thus making the operation of filling the silo very slow and interfering with the continuous employment of the entire force of men. The chief features to be considered in a cutter are that it is strongly made and will cut fine.

Opinions differ as to the fineness to which silage should be cut. The length varies from $\frac{1}{4}$ to 1 inch. The latter is a little too long, as the pieces do not pack so closely in the silo, and they are not so completely consumed in feeding as the shorter lengths. On the other hand, the longer the pieces the more rapidly the corn can be run through the cutter. Fine cutting and thorough tramping are needed if it is desired to make the best quality of silage and fill the silo to its greatest capacity.

Two types of elevators are in use—the old-style chain carrier and the blower. The chain carrier requires less power, but is harder to set up and makes more litter, especially in windy weather, though some chain carriers are so inclosed as to keep the corn from blowing out. In using the blower type the blower should be placed as nearly perpendicular as possible.

Ordinarily, corn should be harvested for the silo about a week or 10 days before it would be cut for shocking; that is, when about 90 per cent of the kernels are dented and at least 75 per cent of the kernels are hardened so that no milk can be squeezed out. At this time the lower leaves on the stalk are turning yellow and the green corn fodder contains 65 or 70 per cent of moisture, which is sufficient for silage. Silage made from corn containing moisture enough for proper preservation is more palatable than that made from corn so mature as to require the addition of water.



The silo should be located within a few feet of the barn

special paint about once in three years. Paint for treating the interiors of silos is easily made of raw coal tar mixed with gasoline and applied with a tar brush. The roof should be inspected to see if it is water-tight, and the doors may well be looked over. They need to fit tight.

Wooden silos, either stave or board construction, require additional attention. The hoops of stave silos should be tightened and any defective pieces of wood replaced. In wood silos, particularly the cheaper ones and those of home make, there is always the likelihood of inlets for air, which will spoil the silage. If the silo is so built as to require guy wires, these should be tightened to keep the building plumb and well braced to withstand winds.

Careful attention should be paid to seeing that the machinery to be used in harvesting and storing the silage is in working condition. In using the corn harvester the bundles should be made rather small. This takes more time, but the extra expense is more than offset by the ease in handling the bundles and feeding them into the silage cutter.

WHY A COW-TESTING ASSOCIATION PAYS

1. Cow testing weeds out the unprofitable cows.

2. It checks up on the sire, definitely determining his value from the standpoint of high production.

3. In the same manner it establishes the value of the heifer calves and thereby affords a dependable basis upon which to select the future cows of the herd.

4. It enables the dairyman to feed his animals intelligently, according to production.

5. It increases the possibility of a profitable sale of surplus cows and calves.

6. It stimulates interest, on the part of the dairyman himself, in the relative producing value of his cows.

7. It has a direct advertising value in that the leading herds or the leading individuals in a herd always receive widespread attention.—Exchange.

GROWING UPLAND COTTON ON ARIZONA PROJECTS

At the present time the important cotton producing centers of the State are on the Salt River and Yuma projects. Timely hints for farmers from the Agricultural Experiment Station at Tucson

COTTON is one of the important sources of income for farmers in Arizona, as pointed out in Timely Hints for Farmers, No. 148, of the Arizona Agricultural Experimental Station. In 1923 the total value of cotton to Arizona farmers was approximately fourteen to fifteen million dollars., the important cotton producing centers being the Salt River and Yuma valleys, with the acreage increasing in various localities in the Gila and Santa Cruz valleys.

Proper preparation of a seedbed for cotton is necessary for the best yield of lint of a good quality. This preparation should begin as soon as possible after the removal of the preceding crop. Any coarse trash on the ground should be chopped fine before it is plowed under to prevent it from interfering with the cultivation of the new crop. When well chopped this material can be easily plowed under. It will then decompose more quickly, and the plant food in it will become available for the use of the growing plants. The ground should be plowed to a depth of at least 7 or 8 inches, and then allowed to weather until within 5 or 10 days of planting time, when it should be irrigated. The soil should be soaked to a depth of 4 or 5 feet. As soon as the ground has dried sufficiently after this irrigation it should be harrowed with a spike-tooth harrow. Heavy types of soil and soil left particularly rough after plowing should be harrowed with a disk followed by a spiketooth harrow. This treatment will save considerable moisture, break the large clods, and to some extent level the land. The best seedbed is one that consists of a finely mulched surface 2 or 3 inches in depth with a firm, moist soil underneath.

In Arizona cotton is grown almost wholly under irrigation, and with this practice the flat method of planting has been used to the greatest extent. When this method is used, the seed bed is left level and the seed planted rather shallow with a two-row planter. Furrow openers are sometimes attached to the cotton planter and used to open a small furrow into which the seed is dropped. This is quite desirable on ground that has become a little too dry for planting by the ordinary methods.

When a farmer is handling large areas of ground and a run of irrigation water can not be obtained oftener than once in one or two weeks, it is a common practice

to list the ground and then irrigate it thoroughly. Planting may then be done on the ridges by harrowing down a sufficient area for each day's planting to provide a good moist seed bed.

The depth at which cotton should be planted varies with the time of planting, with the condition of the seed bed, and with the type of soil. Early in spring when the ground is cold shallow planting is advisable, otherwise the seed may rot. If winds dry the ground rapidly the seed must be placed deeper so that it will have enough moisture to cause germination. Cotton may be planted safely 3 or 4 inches deep in a light sandy soil warmed by the sun, while in a heavy adobe soil that is inclined to be wet and cold and to bake, 1½ to 2 inches is as deep as it is safe to plant. The aim should be to place the seed in a firm, moist, warm seed bed that will remain in such condition until the seed has germinated and the young plants have become well established.

The ordinary practice is to plant cotton in rows 3½ feet apart. It can then be planted and cultivated with ordinary farm machinery without special adjustments. With large and vigorous growing types of cotton in rich soil it is better to put the rows 4 feet apart. The best rule is to use at least 25 pounds of seed per acre.

Much of the success of growing cotton depends upon proper irrigation. Perhaps the most important irrigation is made before the cotton is planted, at which time

the ground should be soaked to a depth of at least 4 or 5 feet. If this is done, and irrigation is then withheld for a considerable time after planting, the plants develop a deeper root system and are more vigorous and better able to withstand unfavorable conditions. Frequent, light irrigations early in the season result in shallow rooting of the plants. Sufficient moisture should be supplied to keep the plants in a healthy growing condition. Severe drying of the ground after the plants begin blooming causes them to shed squares, flowers, and small bolls. Irrigation or heavy rainfall after the plant has been suffering for water stimulates growth, which also causes the plants to shed their bolls. Irrigation should be continued in the fall until the blossoming period is almost ended, but it is advisable to allow the soil to dry out to hasten the maturity of the crop as the time for frost approaches.

The cultivation of cotton should begin as soon as the plants are large enough to mark the row and should be given often enough to keep the ground in good tilth and to keep down weeds and grass. Ordinarily the ground should be left level when the cultivation for the season has been finished. If, however, the ground was not well leveled before the crop was planted, ridging the rows will assist in irrigation and thereby lessen the expense of growing the crop. Deep ridging is almost certain to cut many of the feeding roots and thereby injure the plants.



Yuma cotton grown on the mesa near Yuma, Ariz.

REORGANIZATION SAVES \$103,000

SURVEY of the administrative office of the Bureau of Reclamation conducted by coordinators resulting in an annual saving of \$103,000 has been announced by Secretary of the Interior Work.

The survey, which was completed recently, brought about the dropping of 33 employees in the Washington office of the Bureau of Reclamation through abolishing the positions they held. In the Denver office of the bureau five positions were eliminated and the employees discontinued from the rolls, while two employees at Las Cruces, N. Mex., were also dropped.

The purpose of the investigation was to eliminate unsound business methods in the bureau in order to save the water users' money, to protect the interests of the Government, and to advance the interests of efficient employees. Through the survey unnecessary work, duplication of effort, and other unbusiness-like methods were brought to an end, and both the Washington and Denver offices were put on an efficient basis.

Among the positions abolished in the Washington office as unnecessary were assistant commissioner, commissioner's assistant, editor and office assistant,

statistician, lecturer, laboratory aid, and a number of clerical places. In Denver the positions of assistant chief engineers were eliminated and clerical work as well as purchasing activities consolidated.

In addition to the saving of \$103,000 annually in salaries, other incidental yearly savings in the bureau include unnecessary motor-truck service in Washington, \$600; material for packing supplies, \$500; travel expense for lecturer, \$500; discontinuance of a small Denver publication, \$1,860; the total being \$3,460 a year.

Another important change made in the functions of the bureau following the survey was the discontinuance of the unnecessary handling and review of the legal work of the bureau. Much duplication of work in the accounting division was also eliminated.

AEROPLANE VIEW OF DEPARTMENT BUILDING

The illustration on the second cover page of this issue of the *NEW RECLAMATION ERA* is a reproduction of an aeroplane photograph showing primarily the Interior Department building, but also a number of other interesting features.

The Interior Department building with its three wings stands prominently in the foreground. At the top of the picture the large open space surrounded by trees is the Ellipse or White Lot, directly back of the White House grounds. Near the upper left-hand corner of the picture may be seen the base of the monument which has since been erected in honor of the First Division of our Expeditionary Force. To the right of this is the Corcoran Gallery of Art, and continuing to the right may be seen the Red Cross Building with a passageway leading to its annex, then Continental Memorial Hall, erected by the Daughters of the American Revolution, and beyond, the building occupied by the Pan American Union.

Public baseball diamonds and tennis courts are shown in the upper right-hand corner, and at the right of the picture a number of the long, low, temporary structures erected by the War and Navy Departments during the war to house their largely increased personnel.

The office of Secretary Work is on the top floor of the Interior Department Building at the extreme end of the first or left-hand wing, and that of Commissioner Mead directly opposite on the top floor of the third or right-hand wing, necessitating a walk of nearly three blocks when he is called to the Secretary's office for consultation.

RECLAMATION FUND RECEIPTS

THERE are so many factors involved in a forecast of reclamation fund receipts that there might well be some hesitancy in making any prophecy, but at least the records of past receipts may serve as a guide. For the last five fiscal years these are in round figures as follows:

Receipts, reclamation fund

Fiscal year	Land sales	Mineral leasing acts and power	Project collections	Total actual receipts
1920.....	\$2,696,000	.....	\$4,902,000	\$7,598,000
1921.....	2,523,000	\$4,392,000	4,200,000	11,115,000
1922.....	1,794,000	3,427,000	4,296,000	9,517,000
1923.....	1,391,000	4,395,000	5,144,000	10,930,000
1924 ¹	900,000	6,350,000	6,000,000	13,250,000
Total.....	9,304,000	18,564,000	24,542,000	52,410,000
Averages.....	1,860,800	3,712,800	4,908,400	10,482,000

¹ Partly estimated.

The sources of these receipts were explained briefly in an article in the July issue of the *NEW RECLAMATION ERA*.

One very important element always to be reckoned with and always subject to uncertainty is the possible legislation by Congress affecting the fund. Recently a relief act was passed, the full effect of which is not yet clear. Important legislation affecting the whole scheme of reclamation repayments is pending.

The actual reclamation fund receipts for the last five years have varied from about \$7,600,000 to \$13,250,000. On July 1, 1924, when the new fiscal year began, there was in the fund something in excess of \$6,000,000 cash. Against this the Bureau of Reclamation has cur-

rent appropriations of something less than \$11,000,000. The expenditures are always limited not only to the amounts specified in the appropriation act but to the cash available in the fund, so that the expenditure of the current appropriations anticipates the receipts yet to enter the fund, or sufficient of these to make up the necessary total with the \$6,000,000 on hand.

The receipts from sales of public lands are obviously falling off with more or less regularity, and this is naturally to be expected with the exhaustion of favorable opportunities for homesteading, etc. The annual accretion to the fund from this source fell below \$1,000,000 during the past fiscal year and will probably continue to fall off quite markedly. The oil-leasing receipts are erratic, dependent on the price of oil, the production quantities, discovery of new fields, etc. It is especially difficult to predict this important element. The project collections tend to increase as more land is obligated to repay reclamation expenditures and as the lands already obligated progress in the schedule of repayment under the reclamation extension act from a basis of 2 per cent annually to one of 4 per cent, or from 4 per cent to 6 per cent. This element, however, is affected by the general economic condition of agriculture and obviously is influenced by legislation or the possibility of it in the way of relief acts, new schedules of repayment, etc. In a very rough general way it seems safe from the foregoing tabulation to expect reclamation fund receipts of about \$10,000,000 per annum.

PICTORIAL LESSONS IN PRACTICAL RECLAMATION

LESSON NO. 6



Leveling land on the North Platte project, Nebr.-Wyo.

VERY few fields in irrigated sections are in the best possible condition for irrigating. Although the surface may appear level and regular to the eye, the irrigation water will find high and low spots which will give trouble in distributing the water.

For general leveling purposes the farm level or float is the most practical device. It is not intended to cut off high knolls or fill up deep holes, but following the use of the Fresno scraper or following the harrow or disk on fairly level land it is an excellent device.

The level is made 16 or 18 feet long and wide enough to suit the horsepower available. A level 8 feet wide makes a good load for four horses. The level consists of two planks 2 by 10 inches, 16 or 18 feet long, set on edge, with three, four, or five crosspieces of 2 by 10 inch plank also set on edge to act as cutters. The bottom edge of the crosspiece should be flush with the bottom of the runners. The crosspiece placed across the front should slant forward a little at the top to prevent it digging in too much. The rear crosspiece should be upright. The center crosspieces should have a steel edge to prevent their wearing away. The level should be well braced and supplied with a plank down the center on which the driver can walk back or forward to assist the level in loading and unloading.

After the land has been plowed and harrowed, the level should be run first at right angles to the direction of plowing

DIVERSIFIED FARMING MEANS EXTRA PROFITS

Diversified farming leads to intelligent and progressive agriculture, as pointed out by Oakley T. Norton, of Phoenix, Ariz., in the *Associated Arizona Producer*. The most enlightened and progressive agricultural districts are found where livestock provides one of the chief sources of income. This is due to several reasons: The dairy farmer can not live from hand to mouth, but must lay in a store of feed for his animals throughout the winter months. This

and then in the direction of plowing. Good results are also obtained by running the level diagonally across the field.

If, after going over the land once in each direction with the level, the surface of the field is still irregular, the land should be harrowed again to loosen the surface and the operation with the level repeated. The surface of the ground must be loose or the level will not do good work."

The work done in leveling an irrigated field means labor saved and increased crop yields. Every low spot means just that much land which will be overirrigated. Every high spot means just that much land not sufficiently irrigated. A farm level is a device every farmer should be able to make. The materials are not expensive. It will give years of service, and every operation with it will give good returns.—I. D. O'Donnell.

same care is then carried into his other activities. Under the one-crop system of agriculture the returns from the year's crops all come in at the same time and are spent at that time, with resultant poverty until another crop is harvested. On the other hand, the dairy farmer receives his income at least once a month during the entire year. The good stockman grows proud of his well-bred animals. With pride he may hand down to his sons his reputation as a breeder. He is also able to leave them fertile fields which he has built up rather than robbed.

In the one-crop system of farming there is no successful way of utilizing a large amount of roughage, as straw in the case of the grain farmer. This roughage is often burned without regard for the loss of vegetable matter, so much needed by the soil. On a dairy farm all straw and like materials are utilized for feed, thus converting them into a form suitable for the nourishment of man. At the same time a large part of the organic matter is returned to the fields in the resulting manure.

In summing up the above statements it is seen that dairy farming has the following advantages:

1. Maintains the fertility of the soil.
2. Income received each month.
3. All roughages utilized on the farm.
4. Equal distribution of labor.

"The NEW RECLAMATION ERA is a dandy."—Will R. Holmes, Brigham City, Utah.

CROP CONDITIONS ON THE PROJECTS

THE following is a brief summary of crop conditions on the irrigation projects of the Bureau of Reclamation, Department of the Interior, at the end of June:

Yuma project, Arizona.—Prospects were excellent for a heavy crop of alfalfa seed. Most of the cotton was in bloom. The citrus crop prospects were above normal.

Orland project, California.—Harvesting of the second crop of alfalfa was completed. The yield, however, was only average, and in general this marks the end of alfalfa production for the season, owing to the water shortage. A good crop of apricots was marketed at remunerative prices.

Grand Valley project, Colorado.—Crops continued to make satisfactory growth, and good yields of nearly all products were anticipated. The first cutting of alfalfa was stacked, and the second crop was growing well. Thinning of sugar beets was practically completed, and the growers were hopeful of an excellent crop.

Uncompahgre project, Colorado.—Harvesting of the first cutting of alfalfa was practically completed. The yield was light owing to hot, dry weather. The fruit crop was not injured by late frosts, and good yields were anticipated. The sugar company made an additional payment of \$1 per ton on 1923 sugar beets, bringing the price so far received to \$9 per ton.

Boise project, Idaho.—Grain of all kinds made splendid growth and was somewhat earlier than usual. The potato crop, especially the early varieties, was in fine condition. Corn was well along, but it was doubtful whether it would be of any value except for silage. The fruit crop was well advanced, and where properly taken care of by harrowing will probably pull through the balance of the season despite the water shortage.

King Hill project, Idaho.—The first cutting of alfalfa was about 25 per cent short. The alfalfa weevil was reported in two localities. Potatoes and grain were doing well.

Minidoka project, Idaho.—About 75 per cent of the first crop of alfalfa had been cut. The crop was light, owing to weevil infestation and consequent mowing before full maturity. Beets and potatoes were doing well, but in some fields the stand was poor. The sugar company on June 15 paid a further bonus of 50 cents per ton on 1923 beets, bringing the total price to \$8 per ton and the total paid to project growers to about \$1,136,000. A

much larger tonnage of beets this fall was anticipated.

Huntley project, Montana.—Crops were later than usual, with the exception of small grains, which were in fine shape. Alfalfa promised a good yield. Some damage was being done to sugar beets by web worms, and cold weather retarded the growth of corn, most of which will probably not mature.

Milk River project, Montana.—Flax seeding was completed and cutting of the first crop of alfalfa had begun. All crops, especially corn, were backward, owing to the cool weather.

Sun River project, Montana.—Crops were in good condition, although their growth was somewhat retarded by cold weather. Cutting of alfalfa had begun at the close of the month.

Lower Yellowstone project, Montana-North Dakota.—The stand of corn was in good condition and needed only warm weather to make it develop rapidly. Grain crops promised bumper yields. Alfalfa, sugar beets, beans, and seed peas were in excellent condition.

North Platte project, Nebraska-Wyoming.—Crops all over the project appeared to be in good condition considering the late spring. The first cutting of alfalfa was being put up and a good tonnage was reported. Web worms were causing serious concern to beet growers, and measures were being taken to stop their ravages.

Newlands project, Nevada.—Harvesting of the first crop of alfalfa, which was of excellent yield and quality, was practically completed. Grain and cantaloupes were in fine condition with the exception of those on lands under the Truckee Canal, where scarcity of water was beginning to have a marked effect.

Carlsbad project, New Mexico.—The cotton crop made rapid progress, owing to extremely warm weather, and gave promise of a large yield. Harvesting of the first crop of alfalfa was completed, and in many cases the second crop was being cut at the end of the month. Yields and prices were satisfactory.

Rio Grande project, New Mexico-Texas.—Indications pointed to an excellent cotton crop. The second cutting of alfalfa was expected to produce a good yield. A ready market for garden truck was found in the vicinity. A light, early fruit crop had been marketed.

Williston project, North Dakota.—The growth of most crops, especially sugar beets and corn, was retarded by cold weather. Grain and alfalfa were in ex-

cellent condition. About 70 per cent of the sugar-beet crop had been thinned at the end of the month.

Umatilla project, Oregon.—The first crop of alfalfa was harvested, some hay being discolored by rain. Potatoes were shipped during the month, but soon came into competition with California shipments. The growers received prices varying from 3 to 12 cents per pound. Strawberries and other small fruits brought good prices, but the quantity was small.

Klamath project, Oregon-California.—Cutting of the first crop of alfalfa began on June 15 and was about half completed at the end of the month. Farmers were expecting a price of at least \$14 to \$15 per ton. Grain crops were below normal, and on the Tule Lake leased land about one-third of the crop was lost by frost, drought, or grasshoppers.

Belle Fourche project, South Dakota.—Corn planting was completed about the middle of the month, but germination was delayed, owing to lack of moisture. Harvesting of alfalfa had begun. Small grains, potatoes, and sugar beets were making satisfactory growth.

Strawberry Valley project, Utah.—Continued hot and dry weather damaged the crops to some extent. The yield of the first cutting of alfalfa was good. The shortage of hay in other sections resulted in doubling the price for the first cutting. Buyers were endeavoring to contract for hay at \$15 per ton. The cherry crop, although of excellent quality, fell below expectations. About 80 per cent of the usual tonnage of sugar beets was anticipated.

Okanogan project, Washington.—The apple crop was estimated at about 50 per cent of that of last year. Early quotations indicated that the prices would be better than last year.

Yakima project, Washington.—The first cutting of alfalfa was harvested, and new potatoes were being dug and started to market. Cherries had been harvested and apricots and early peaches were being gathered at the end of the month. It was estimated that the valley peach crop would be about 750 cars, or approximately 50 per cent of the usual crop. Sixty cents a box was being offered and refused. The prospects for an average pear crop were good, with indications that the price would range from \$55 to \$60 per ton.

Shoshone project, Wyoming.—The first cutting of alfalfa began during the last week of the month, but in many fields the hay was short. The potato stand was estimated at 65 to 80 per cent of normal. The sugar-beet stand was excellent, but growth was slow, owing to cold weather. The project showed large increases in the acreage of beans, sugar beets, corn, and wheat and a decrease in the potato acreage.

COST OF PRODUCING FIELD CROPS

THE Bureau of Agricultural Economics of the Department of Agriculture has issued some interesting figures on the cost of producing certain field crops in 1923. In the cost figures are included charges for labor of the farmer and his family, and a charge for the use of the land on a cash rental basis; so that if the cost just equaled the price, the farmer was paid for his time and his investment.

The several items of cost per acre include the following: Preparation and planting, cultivation, harvesting, marketing, miscellaneous labor (including irrigation and water, spraying and spray material), fertilizer and manure, seed, land rent, and miscellaneous costs (sacks and twine, crop insurance, use of implements, use of storage buildings, and overhead).

The average gross cost of producing an acre of corn in the western division, based on 457 reports, amounted to \$21.60. With a credit of \$2.58 for stover, the net cost of production was \$19.02 per acre, or 66 cents per bushel for a yield of 29 bushels per acre. The average sales value of the corn was 73 cents per bushel; this leaves a margin of 7 cents per bushel, or \$3.14 per acre above the cost, after charging for all expenses, including family and operator labor and use of land.

A summary of 997 reports showed that the average gross cost of producing an acre of wheat amounted to \$24.99 in the western division in 1923. The credit for straw was \$1.04 per acre, leaving an average net cost of \$23.95 per acre and \$1.09 per bushel, the average yield being 22 bushels per acre. The average sales value per bushel was 87 cents, and the value per acre was \$4.56 less than the cost per acre. This does not represent an actual cash loss; it does mean, however, that many farmers did not receive sufficient income from wheat to pay all cash expenses of production and allow them going wages for their time and the cash rental value of their land as reported.

A summary of the 704 reports on the cost of producing oats in the western division showed an average gross cost per acre of \$24.34, a credit of \$1.60 for straw, and a net cost of \$22.74 per acre. The average yield was 41 bushels per acre, making an average net cost per bushel of 55 cents. The average sales value per bushel was 49 cents, or 6 cents per bushel and \$1.90 per acre less than the cost.

Summarizing the 321 reports on the cost of producing potatoes in the States

of Montana, Wyoming, Colorado, Utah, Idaho, Washington, Oregon, and California, it was found that the average gross cost per acre was \$69.73 and the credit for by-products 90 cents, making a net cost of \$68.83 per acre. The average yield was 149 bushels per acre, giving an average net cost per bushel of 46 cents. The average sales value per bushel was 70 cents, leaving a margin of 24 cents per bushel, or \$28.24 per acre above the cost.

In a recent issue of the *Irrigation Review* data are given showing the cost of producing sugar beets in Montana and Utah. The items of cost include seed, man labor (at 30 cents per man hour), horse labor (at 10 cents per horse hour), machinery, irrigation taxes, and land rental. The total gross cost of production in Montana amounted to \$62.55. Based on a yield of 10.76 tons per acre,

valued at \$9 per ton, the gross value of the crop amounted to \$96.84, yielding a net income of \$34.29 per acre. In Utah the cost of production is given as \$59.11. Based on a yield of \$14.48 tons per acre, the gross value of the crop at \$9 per ton amounted to \$130.32, giving a net income of \$71.21 per acre.

In this connection attention is called to the fact that there are two items of income in sugar-beet raising that should not be overlooked. The tops from the beets make excellent feed for cattle, especially milk cows. The other item of revenue is the excellent condition in which beets leave the soil for the next crop. All who have grown beets have noted the heavy grain crops following beets.

"I have always valued the *NEW RECLAMATION ERA* highly and know that I shall continue to do so. We have a file of marked copies covering many years."—*Prof. G. E. P. Smith, University of Arizona, Tucson, Ariz.*



Planting beans on new land, Grand Valley project, Colo

GRAND VALLEY BULLS ON UNCOMPAHGRE FARMS

MR. H. A. IRELAND, agriculturist on the Uncompahgre project, has sent to the New RECLAMATION ERA photographs of four young Jersey bulls, shown in the accompanying illustration, which are at the head of four Jersey herds on the Uncompahgre project, Colorado. These bulls were all bred at or near Grand Junction, Colo., and are owned by members of the Mesa County Jersey Club. They have been loaned to breeders or dairymen on the Uncompahgre project without charge.

Mr. Ireland states that there are also four other bulls in use in Uncompahgre herds which were obtained under the same terms. The Mesa County breeders are doing this in part as advertising and in part to get these young bulls in service where they can be proved and later returned to their breeders if they are found to be of exceptional merit. The plan has been very beneficial to Uncompahgre

UNCOMPAHGRE BREEZES

*A bit of a blow, and the wind dies out,
And the glorious stars ensue;
Then a golden dawn and a cloudless day,*

*With a sky of matchless blue.
Blow, brief winds, with your clouds of dust,*

*More good than ill ye blow;
For ye clear the skies and ye sweep the roads*

*And ye drink up the overflow—
With headgates wide till the waters subside*

Nor drouth nor flood we know.

—MINNIE E. BLAKE,
Montrose, Colo.

farmers who needed herd sires and were not in position to buy well-bred animals.

These bulls are all of good breeding, and some of them have been in service on the Uncompahgre project long enough to have heifers which are showing con-

USING LIVESTOCK TO HARVEST CROPS

Saving farm labor by harvesting crops with livestock became a popular method of solving the labor problem on the farm during war times, and it is one that is just as applicable now as then on a great many farms and in regions of man shortage. The use of hogs, sheep, and cattle to gather the corn crop, alfalfa, soy beans, and other grain and forage crops is told in Farmers' Bulletin 1008 by pictures.

siderable promise. One bull of the group of eight is in use by a bull club near Delta. He is an aged animal which the owner did not care to sell, but could not use at the present time. Some of his heifers are in production and are showing exceptional type, as well as being good producers.

A definite campaign is being carried on on the Uncompahgre project in the direction of better sires and better livestock, in which the cooperation of Mesa County breeders has been a decided advantage.



TWO-YEAR-OLD REGISTERED JERSEY BULLS

1. Bred by E. G. Pettingill, Grand Junction, Colo.; loaned to J. A. Daly, Uncompahgre project
2. Bred by E. G. Pettingill, Grand Junction, Colo.; loaned to W. W. Price and W. A. Patching, Montrose, Colo.
3. Bred by Mr. Flint, Grand Junction, Colo.; loaned to L. A. Armstrong, Montrose, Colo.
4. Bred by Louis Harms, Grand Junction, Colo.; loaned to A. J. Theby, Montrose, Colo.

RECLAMATION LAW DECISIONS

R. GLAVIN was a settler on the Salmon River irrigation project in Idaho, which was constructed under the Carey Act. His contract for a water right entitled him to $2\frac{3}{4}$ acre-feet of water per acre and provided for certain payments plus interest at 8 per centum per annum from date of notice that water was available. The water supply was never sufficient to give more than 76 per centum of the quantity named in the contract. In a suit brought against Glavin to foreclose the lien in the contract, Glavin contended that interest should not be charged, as all of the water provided by the contract had never been made available. The circuit court of appeals held (*Glavin v. Commonwealth Trust Co.*, 295 Fed. 103) that Glavin's situation was the same as that of all the other water users under the project, that though they had not received all of the water named in their contracts they had in fact received a substantial amount, and that under all the facts and circumstances of the case it was equitable that interest should be paid.

If the officers of public service corporations, such as telegraph and telephone companies, who sign regular service contracts on their behalf with the Government, are the same officers who are authorized to and do sign such regular service contracts on their behalf with the public generally, and if a certificate by the contracting officer to that effect is attached to the contract, that will satisfy the requirements of the General Accounting Office. (Dec. Comp. Gen. January 21, 1924.)

The General Accounting Office of the United States withheld credit in the accounts of the fiscal agent on the North Platte Federal irrigation project in connection with certain vouchers covering expenditures incurred on contract construction work for the reason that applications for extension of time for completion of contracts were not made before the date specified for completion of the work. On review, the Comptroller General reversed the original settlement (3 Comp. Gen. 406) and allowed credit for the amounts previously suspended, using the following language as explanatory of his action:

The contracts fix no time within which request for extension of time for delays

must be made, and no time limit having been agreed upon contractors were entitled to a reasonable time after the delay or delays occurred and before final settlements, determinable from the facts and circumstances. Contractors were water users on the reclamation project they were improving and were in a sense working for themselves. It may safely be assumed they would have no purpose to unnecessarily delay completion of the improvement. While it appears their formal requests for extension of time were made in each instance after the date fixed for completion * * * all were made prior to final settlement and appear to have occasioned no loss or inconvenience to the United States. In the circumstances appearing, I am of opinion the application for extensions of time were made within a reasonable time after the occurrence of the excusable delays.

Certain Government buildings at Powell, Wyo., connected with the Shoshone Federal irrigation project, were lighted by electric current furnished under contract with the town of Powell. A general regulation of the town provided that a charge of 10 per cent would be added to bills not paid by the 10th of the month after rendition of bill. This regulation was not referred to in the contract. It was provided in the contract that payment would be made "as soon after the receipt of each month's bill from the contractor as the necessary vouchers can be prepared." A delay beyond the 10th of the month occurred as to certain bills because of a dispute as to the interpretation of the contract, and the town billed the Government for a penalty of \$2.39. The matter was submitted to the Comptroller General who decided (3 Comp. Gen. 427) that as the penalty was not provided for by the contract it was immaterial whether the regulation was in effect when the contract was made and that payment of the penalty would be an addition to the contract price of the service rendered and would be in contravention of the provisions of section 3648, U. S. Revised Statutes.

On the Yakima Federal irrigation project in Washington the United States hired from Charles Whitaker a team of horses with harness for project use at the agreed price of \$35 a month. The contract provided that the United States

would feed the horses and "use ordinary care in the use of all stock while in the possession of the Government." One of the horses stepped upon a double-bitted ax left sticking in a small fallen tree by a Government employee, and an artery was severed. The nearest available veterinarian, 63 miles away, was called to care for the wound, for which service he submitted a bill for \$40. Payment was allowed by the Comptroller General (3 Comp. Gen. 505), on the ground that there was lack of the ordinary care required by the contract "in leaving a double-bitted ax so placed that a horse in lifting its feet would be in danger of striking the upturned edge and in driving the horse over an ax so placed."

The organization by appropriators of water in California of a corporation for the declared purpose of selling the water for manufacturing, mining, and other public purposes in a vast area of gold-bearing and agricultural lands, the establishment of the system, and actual furnishing of water for many years to thousands of consumers indiscriminately at rates adjusted to the uses to be made of it, and readiness to comply with such declaration of purposes are sufficient in the absence of countervailing facts to justify a finding by the California (Public Utilities) Railroad Commission that the water was dedicated to a public use and that the corporation was a public utility. Waters so dedicated retain the impress of the dedication in the absence of a showing that there has been a revocation thereof. (*Williamson v. Railroad Commission*, 222 Pac. 803.)

W. H. Thomas, purchaser of 40 acres of school land in Idaho, contracted for a water right for the land from a Carey Act project controlled by the Twin Falls Land & Water Co. The contract provided that after certain defaults all rights under the contract could be declared forfeited; also that the company might foreclose the lien in the contract in the manner that mortgages on real estate are foreclosed. An attempt to enforce a forfeiture resulted in a suit in which the Supreme Court of Idaho held (*Rogers v. Thomas*, 226 Pac. 165) that the forfeiture provision of the contract was void; that the statute provided but one remedy—that of foreclosure of the lien—and that remedy was exclusive.

"I believe the NEW RECLAMATION ERA will serve those who get it better than ever before."—*John A. Goodall, MOUNTAIN HOME, IDAHO, KING HILL project.*

MEMBERSHIP LOYALTY TO THE ORGANIZATION

Membership loyalty is often mentioned as an essential to the success of a cooperative undertaking. There is no doubt that the cooperative spirit is strongly developed among exchange growers. Very many of them have never marketed products under any other system and have never considered the adoption of any other plan. In addition, the majority recognize that as members of a group they can not consistently seek personal advantage at the expense of their fellow members.

Loyalty to the organization, however, does not prevent criticism of its real or imagined shortcomings. Local pride may sometimes soften criticism of the management of an association, but the activities of the central exchange are subjected to a constant and critical scrutiny. The officers and directors of the exchange must be sure of their ground; they must be able to demonstrate that the action taken in a particular instance was well-considered and, according to the best judgment available, in the interest of the members. This tends to consultation and the absence of anything savoring of autocracy on the part of the central office. It does not, however, relieve the management from the responsibility of initiating improvements and taking such action as is necessary to correct changing condi-

HOT WEATHER HINTS FOR SHIPPING HOGS

1. Haul or drive your hogs into shipping station in ample time to allow them to become rested and cool before loading.

2. Insist upon clean car or one with perfectly clean sand.

3. Wet down the sand and interior of the car before loading.

4. Give only light grain feeding before shipping. Heavy feeding means more body heat generated.

5. Load not more than half an hour before the train departs.

6. Load slowly and carefully; avoid excitement, and do not beat or bruise the hogs.

7. Load not to exceed 16,000 pounds in a 36-foot car during warm weather.

8. Have cars drenched at every available point immediately after train stops.

9. Use ice in bags suspended from the roof whenever possible. Four to six bags to a car will suffice, according to distance.

10. Report any inattention or neglect to your commission man immediately upon arrival.

tions. The situation, perhaps, may be summed up by the statement that an

DAIRY BARN NEEDS GOOD VENTILATION

Fresh air is as necessary for livestock as for human beings. It is possible to maintain a comfortable temperature in a well-built dairy barn and yet have appreciable circulation of air. A tightly built barn will be damp and foul unless ventilation is provided. A good ventilation system in a well-built barn will supply fresh air and remove foul air and moisture without causing drafts and make possible the control of the temperature of the barn. The heat generated by the animals is used to warm the barn and to promote air circulation. In cold climates, if good ventilation and a warm barn are to be secured, it is essential that heat be conserved by proper insulation and the proper proportioning of the size of the barn to the number of animals it is to hold.

Farmers' Bulletin 1393 of the U. S. Department of Agriculture explains the general principles underlying the ventilation of barns and discusses the systems of barn ventilation in common use.

appeal to the loyalty of exchange members must be based on facts and information; it can not be made on the basis of a blind faith in the wisdom of the management.—Bulletin No. 1237, Department of Agriculture.



Grand Valley project hogs about ready for the market

AUSTRALIA POINTS WAY IN RECLAMATION LAWS

Commenting on the Smith reclamation bill, embodying the recommendations of the Committee of Special Advisers on Reclamation, the Engineering News-Record calls attention as follows to what has already been accomplished in the way of remedial legislation by Australia in connection with irrigation problems there:

"In a very similar situation, constructive action has already been taken in another great irrigation-farming country, namely, Australia. With less important issues and less experience to serve as guide, the Australians have worked out sound modern legislation for irrigation development. The State of New South Wales, faced with the necessity of organizing and managing a large irrigation settlement, has enacted a law embodying principles much like those of the Smith bill. These laws recognize the necessity for careful determination of the all-around practicability of a proposed irrigation before it is undertaken. They require that settlement shall be based on a reasonable showing of probable success of the settler and on a fair initial capital. The large money investment necessary to modern arid-land irrigation is recognized, and on the basis of searching investigation of the cost of farm development a broad scheme of low-interest financing on sound banking principles is provided for. Agencies are established to give advisory aid in agriculture and marketing, and proper checks are placed upon land profiteering and speculation to protect both the State enterprise and the individual farmer. The laws engage the State and the Commonwealth in a joint partnership with the settler in working out the problem of agricultural development so effectively that each partner will bear the particular burden which he is best fitted to carry.

"It is precisely such legislation that we need in the United States, and that the Smith bill will in a large measure provide."

The continuous and exhaustive investigations of the affairs of the Bureau of Reclamation, almost from its inception, form an excellent commentary on the manner in which our national activities are subjected to scrutiny.

Criticism from the outside, when made in good faith, is nearly always helpful to a great cause if acted upon.

THE BUSINESS OF TURKEY RAISING

THE business of turkey raising, where conditions are suitable, as they are on a number of the projects of the bureau, is quite profitable. It is usually carried on as a side line on general farms, though in some parts of the United States it constitutes the chief source of revenue from farming operations.

There has, however, been a general lack of interest in turkey raising as an enterprise; there has been a dearth of knowledge as to the best methods in the management of the breeding stock, particularly the growing stock; there has been little investigational work in the control of disease and other matters of primary importance in producing turkey meat at a profit.

Another fundamental essential is to keep healthy and vigorous breeding stock in the best possible breeding condition. The breeders should get plenty of exercise and should not be fed too heavily on fattening rations. The great difficulty is to get stock that is free from blackhead, but one can at least select breeding stock based on constitutional vigor. By breeding from the most vigorous birds every year, a flock of healthy stock may be developed and maintained. Certainly much more care should be exercised in the selection of male breeders each year.

Both old and young turkeys should be protected from dampness. In sections of the country where dampness is prevalent, or where rainstorms are frequent, the



Rapid transit on the Orland project, Calif.

Farmers' Bulletin 791, issued by the United States Department of Agriculture, has been prepared primarily to bring to the attention of those interested in turkey raising some information which may be of value in improving conditions and thus give rise to more satisfactory results. A summary of the bulletin follows:

To be successful in turkey raising, one must give the most careful consideration to certain fundamental factors. The turkeys, especially the growing stock, must be kept under the best possible conditions.

Free range seems indispensable, although there are a few who have made a success in raising turkeys in confinement. A more thorough test of this method is necessary, however, before it can be advocated. Certainly abundance of free range on clean soil is greatly to be preferred. Every effort should be made to keep the soil sweet and clean. This is particularly true of the soil on which the birds are fed and where they roost.

birds should be provided with suitable protection.

It is very important not to feed the poults too heavily, especially for the first few weeks. Keep them just a little hungry.

Watch the poults carefully for the appearance of lice and take every precaution to keep them in check. Disinfect the brooding quarters regularly as well as the poults and examine them from time to time to see that they are not suffering from the pernicious lice, which sap their vitality to a large extent.

As far as possible remove the cause of any disease that might appear. Clean soil, sanitary quarters, and hygienic methods of feeding will do much to reduce mortality. Success in turkey raising is largely a question of proper management.

"I read all of the NEW RECLAMATION ERA, which scores right to the line. I like it."—Fred Sullivan, Omaha, Nebr., Riverton project.

PUT MANURE ON LAND AS SOON AS POSSIBLE

Wherever conditions permit, it is a great saving to apply manure to the land as soon as it is made, according to George Stewart, agronomist of the Utah Agricultural Experiment Station. Such great and rapid losses result from piling, even under the most favorable circumstances, that direct application is to be sought after when at all possible. Sometimes the snow seems so deep that manure applied on top of it is almost sure to be carried off the land during the first thaw. However, except when the land is rather steep and frozen under the snow, there is little likelihood of this happening. Many of the most successful dairy farmers dump the manure from the stables right into a manure spreader, and as soon as a load has accumulated haul it out and scatter it on the land.

If for any reason hauling can not be done during the winter a part of the losses that ordinarily take place can be avoided by having the pile under shelter. Where a shed is available and manure can be kept compact, losses may be reduced from 50 per cent of the total value to about 20 per cent. Feeding under a shed permits the animals to tramp the manure and make it relatively air-tight and will protect it from leaching.

CONTENTMENT DEPENDS ON SOCIAL CONDITIONS

The water users are social beings; and the fact that they have undertaken to reclaim vast deserts does not change their natures to such an extent as to make them able to continue happily in their work unless proper social conditions prevail. Especially is this so with the women on the projects, who are kept more constantly within the walls of the home. Unless the women are provided with proper social relaxation they are likely to develop discontent which will be felt through all the concerns of the water users. The children must also be provided with proper means for arriving at a social maturity in terms of modern understanding. This presupposes schools and other educational facilities, without which it is difficult to provide properly for the development of youth. All these conditions leading to social contentment must be somehow provided if the farmer is to do his work well and to make reclamation successful.—Report of Committee of Special Advisers on Reclamation.

LOAN ASSOCIATION AIDS DAIRY FARMERS

The Montana Mutual Dairy Loan Association, of Missoula, Mont., was created for the purpose of lending money to farmers in western Montana to enable them to increase their dairy herds and finance building improvements. It also finances transactions whereby local dairy cattle are bought and sold and imports from adjoining States purebred stock for sale to its members. Under a law passed by the recent legislature, the organization is placed in the same class as building and loan associations.

A recent statement issued at the close of the first six months' operations shows that, after reserving 30 per cent of its earnings as a guarantee of future dividends and placing 15 per cent in a contingent fund to liquidate possible losses, the association made a cash payment to stockholders of 4 per cent on their investment, or at the rate of 8 per cent a year.

Plans for the future, although conservative, contemplate a substantial expansion which the demand for cattle indicates will be necessary.

Sometimes it is necessary that piles be built in the open, in which case leaching and fermentation combined are likely to cause losses amounting to more than half the fertilizing value of the manure. Loose piles under the drip of eaves suffer

SWEET CLOVER MAKES A GOOD PASTURE CROP

The advantages of sweet clover over grass as a pasture crop are that sweet clover requires less water, is established quicker, and is a soil builder rather than requiring manure. The disadvantage is that a new field must be seeded each year for pasture the following summer, and should there be a failure in getting a stand the farm would be without pasture the following year.

Perhaps the best time and method of seeding sweet clover is early in the spring with barley as a nurse crop. The following four-year rotation is suggested for those who wish to grow sweet clover for pasture: (1) Barley and sweet clover; (2) sweet clover pasture; (3) potatoes, corn, or beets; and (4) corn or beets. As grasshoppers do not damage sweet clover seriously, a stand of it is not so difficult to get as alfalfa. It is evident that sweet clover has a beneficial effect on succeeding crops, just as is the case with alfalfa.

heaviest loss, whereas compact piles well away from drip of eaves and not in low places where ponding takes place lose only about 25 to 30 per cent. This is still a heavy loss, but only about half that suffered by loose piles under eaves.



Government road and Shoshone reservoir, Shoshone project, Wyo.

ONE-CROP SYSTEM MAY BE FAILURE

The farmer who would prosper, according to P. G. Holden, agriculturist, must have something to sell every day in the year, so that his cotton or his wheat or whatever his main crop is may be his cash crop.

The man who farms by the one-crop system is wagering his season's labor that nature will be especially kind to him. He is betting that conditions for the growth of that particular crop, conditions which he can not possibly regulate, will be satisfactory.

If his one crop is wheat, he is gambling that he will escape smut and rust, drouth, wind and hail, the chinch bug, Hessian fly, and other crop enemies. If his one crop is cotton, he is staking his season's work against the work of the boll weevil.

He may escape smut and rust, the chinch bug and the boll weevil, but he is robbing his soil, and he can not possibly escape the loss of soil fertility.

The raising of other crops and the growing of livestock, especially dairy cattle, will give the farmer something to sell when the rust takes his wheat or the boll weevil takes his cotton.

The man who is hardest hit by a crop shortage or by bad market conditions is the one-crop grain or cotton grower.

The dairyman, the man who follows diversified farming, the hundreds of homes where poultry supplies the table and clothes the family—these enjoy continued prosperity every day of the year.

A one-crop system takes the life out of the soil and impoverishes the people. It is only through diversified farming and the using of our energies every day in the year that we can make a rich country and a strong, vigorous people.

Diversified farming means livestock, dairying, crop rotation, more pastures, less washing of the soil, more productive land, greater profits.

Wherever you can raise corn and clover you can grow dairy cattle, and wherever you find dairy cattle you will find high-priced land and prosperous, growing communities.

"I think there is very little room for improvement in the NEW RECLAMATION ERA."—George R. Lackey, Sunnyside, Wash., Yakima project.

"I always liked the RECLAMATION RECORD. The NEW RECLAMATION ERA is all right."—Albert E. Stilwell, Paul, Idaho, Minidoka project.

PURE SEED GROWERS UNITE FOR QUALITY

At the Olathe Corn and Potato Show, on the Uncompahgre project, Colorado, a movement was inaugurated to band those interested in the production of pure seed into an association to further the progress being made in this line. The objects of the association are as follows:

First. To standardize the variety of crops needed in the proper system of farming in this district.

Second. To introduce and improve pure seed of these varieties.

Third. To attend to the details of the registration of this seed.

Fourth. To advertise, promote, and help in the sale of this registered seed and other good seed.

There is a great deal of good possible from such an organization. It will include all sorts of seed, such as corn, alfalfa, grain, potatoes, etc. Instead of shipping in certain kinds of seed, an outside market can and should be developed in less favored localities after supplying the local demand first. The demand for better seed is constantly growing as producers learn that the very best seed is the cheapest in the long run.

WHITEWASH FOR DAIRY AND POULTRY HOUSES

A good formula for preparing whitewash for the inside of dairy barns and poultry houses is suggested by the Montana State College, according to the Utah Farmer.

Slack a half bushel of quicklime or lump lime with boiling water, keeping the container covered during the process. Strain to remove lumps and insoluble material. Dissolve a peck of salt in warm water and add this to the solution. Put 3 pounds of rice in water and boil to a thin paste. Dissolve a half pound of Spanish whiting and a pound of clear blue in warm water. Mix all materials together and let stand for several days. Apply with a whitewash brush and have the mixture as hot as possible when applying. The addition of 1 ounce of alum for each gallon of whitewash improves the sticking properties of the whitewash, and the addition of a pint of molasses for each gallon causes it to penetrate better. Considerable gloss will result if a pound of cheap soap is used for each gallon of the liquid.

CONTROL FIELD MICE AND SAVE ORCHARDS

Thousands of valuable orchard trees are killed by field mice every year. Damage amounting to millions of dollars annually is also inflicted by mice on pasturage, forage, grain, and other crops, and on tubers, small fruits, flowering plants, and shrubbery. By the use of proper control measures much of this loss might be prevented.

The control of field mice in orchards should be undertaken at stated intervals as a regular feature of orchard practice, just as spraying is done to combat insect pests or fruit diseases. Methods of preventing injury in orchards may be grouped in four classes: Removing mouse shelter, treating trees with washes to repel mice, inclosing trees with mechanical protectors, and killing the mice. Mechanical protectors and clean cultivation around trees are successful aids to meadow-mouse control, but have very little effect on pine mice, which do not rely on surface vegetation for food or protection.

The two practical methods of destroying both meadow mice and pine mice are trapping and poisoning. Field mice are very readily caught in strong mouse traps and are usually exterminated by persistent trapping. The labor involved on a large area, however, makes this method costly. The use of poison is by far the most satisfactory way of controlling field mice. Successful formulas for preparing baits and directions for distributing them are given in Farmers' Bulletin 1397 of the U. S. Department of Agriculture.

If it is impracticable to use the recommended additional materials, ordinary whitewash will be greatly improved if skim milk is used in place of water. This gives a product that sticks better and lasts longer. The casein of the milk, being sticky and the basis for glue, combines with the lime, forming a compound which will stick to wood and which is fairly waterproof.

One who has been using underground seepage waters for irrigation in Idaho has no right to insist as against a drainage district that the water table be maintained at the existing level. And if the table of such seepage waters is lowered by the operation of the drainage district's system the party using the seepage waters for irrigation can not recover damages from the district because of the lowering of the water table. (Nampa and Meridian Irrigation District v. Petrie et al. (Idaho), 223 Pac. 531.)

AGRICULTURAL CLOUD HAS SILVER LINING

The Department of Agriculture points out that the present slump in farm product prices can not be attributed to an increase in the per capita area of land under cultivation as was the case in the nineties, owing to the settlement of the Middle West and Western States. On the contrary, the last 20 years have seen a sharp decline in the per capita area of cultivated land.

Diminished buying power in continental Europe has temporarily hidden the fact that the trend in this country is toward an increased pressure of population on land resources, which is expected to become apparent again within a very few years. This trend has also been interrupted by other causes, among which is the fact that in recent years there has been a gradual reduction in the per capita acreage of crop land employed in livestock raising and an overexpansion in the per capita acreage of wheat and rye at the expense of other crops.

These considerations are not cited to give the impression that a revival of American agriculture based on a demand for increased production is just around the corner, yet it is noted that the bearish outlook is offset to some extent by the fact that the population of the world is increasing at the rate of about 20,000,000 a year and that of the United States at about 1,500,000 a year. There is consequently nothing overoptimistic in predicting an increased demand for American farm land, and consequently for American farm products within a few years.

INTENSIVE FARMING VITALLY NECESSARY

Irrigation agriculture has to compete with other forms of agriculture, with the handicap of having to maintain the overhead cost of the irrigation system and the annual cost of maintaining that system and of applying the water to crops. Irrigation agriculture, therefore, must be made intensive and must make use of every opportunity to increase profits, if it is to survive in competition with agriculture in humid regions. It has the advantage of relatively steady yields from year to year because of the constant supply of water, and relatively large yields if the soil is well tilled and irrigation is practiced properly. Under the most favorable conditions, it is of importance that definite plans be laid for the establishment in each locality of systems of agriculture that may promise the largest returns to the farmer. For that reason it might be well for those in

ESSENTIAL ELEMENTS IN COOPERATIVE MARKETING

The experience of this and other countries has evolved a number of principles of farmer cooperative marketing, which are given by Wm. A. Schoenfeld of the Department of Agriculture, as follows: The organization should be controlled by its farmer members; the organization should have a well-defined object in view; the organization should be based on a single commodity or a group of closely related agricultural commodities; a sufficient volume of business; good management; strict accounting; and a self-perpetuating organization.

"Any form of organization which recognizes and provides for these principles has in it the elements of success. Whether an organization shall consist of one central association or be based upon local units is not of primary importance so long as the organization is cooperative in spirit and is based upon cooperative fundamentals. It is fundamental that the membership be informed regarding the policies of their organization, and that they should understand its problems and support the organization with a loyalty based on knowledge and not on blind faith in the wisdom of one or two leaders."

DIFFICULT FOR TENANTS TO BECOME FARM OWNERS

If tenants are to accumulate out of their own earnings enough money to make the initial payment on a farm, they must do so by one or more of the following methods: (1) Make their farms earn higher than average incomes, (2) pay rent on their land at a rate lower than the prevailing mortgage rate of interest in their neighborhood; (3) own part or all of their operating capital when they become tenants; (4) live in more cases on less than \$600 a year in addition to what the farm supplies in kind; (5) keep production costs down by employing the members of the family without wages.

Employing family labor without wages is a possibility of considerable importance to the intending purchaser. Studies of labor contributed by members of farm families show that over a series of years such labor had an average valuation of \$211 on a group of 60 farms, or 21 per cent of the expenses of these farms. In calculating farm incomes, a deduction is usually made for the unpaid labor of the farm family. It represents a return which is not included in rent, interest on



Ruth dredger cleaning a lateral on the Belle Fourche project. S. Dak.

control of the reclamation venture as a whole, as well as for the organizations responsible for the welfare of each project, to undertake careful planning with respect to the specialized and diversified crops that may be grown profitably on each project, and then to develop on the projects proper organizations, especially of a cooperative character, for advancing the system that may be decided upon. Intensive agriculture, under a close cooperative organization, is the only safe

the investment, or payment for the services of the farm operator himself. Where the tenant has no unpaid labor from which to increase his margin of return over necessary expenditures, he carries an additional handicap in his struggle to become a farm owner.

agricultural road to success under irrigation.—*Report of Committee of Special Advisers on Reclamation.*

ADMINISTRATIVE ORGANIZATION FOR THE BUREAU OF RECLAMATION

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John H. Edwards, Solicitor for the Interior Department; E. K. Burlew, Administrative Assistant to the Secretary; J. H. McNeely, Assistant to the Secretary;

John Harvey, Chief Clerk

Washington, D. C.

Elwood Mead, Commissioner, Bureau of Reclamation

C. A. Bissell, Engineer

J. B. Beadle, Chief Clerk

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Barry Dibble, Electrical Engineer

Harry Caden, Fiscal Agent

W. A. Meyer, Fiscal Inspector

Project	Office	Superintendent	Chief clerk	Fiscal agent	District counsel	
					Name	Office
Belle Fourche.....	Newell, S. Dak.....	F. C. Youngblutt.....	R. C. Walber.....		Brooks Fullerton.....	Mitchell, Nebr.
Boise.....	Boise, Idaho.....	J. B. Bond.....	E. R. Mills.....	C. F. Weinkauff.....	B. E. Stoutemyer.....	Boise, Idaho.
Carlsbad.....	Carlsbad, N. Mex.....	L. E. Foster.....	V. L. Minter.....	V. L. Minter.....		
Grand Valley.....	Grand Junction, Colo.....	S. O. Harper.....	W. J. Chiesman.....	C. E. Brodie.....	J. R. Alexander.....	Montrose, Colo.
Huntley.....	Ballantine, Mont.....	A. R. McGinness.....	J. P. Siebeneicher.....	Miss M. C. Simek.....	E. E. Roddis.....	Helena, Mont.
King Hill.....	King Hill, Idaho.....	G. H. Harris.....	E. V. Hillius.....	E. V. Hillius.....	B. E. Stoutemyer.....	Boise, Idaho.
Klamath.....	Klamath Falls, Oreg.....	H. D. Newell.....	N. G. Wheeler.....	G. R. Barnhart.....		
Lower Yellowstone.....	Savage, Mont.....	H. A. Parker.....	E. R. Scheppelmann.....		E. E. Roddis.....	Helena, Mont.
Milk River.....	Malta, Mont.....	G. E. Stratton.....	E. E. Chabot.....	G. S. Moore.....	do.....	Do.
Minidoka.....	Burley, Idaho.....	E. B. Darlington.....	E. C. Diehl.....	Miss A. J. Larson.....	B. E. Stoutemyer.....	Boise, Idaho.
Newlands.....	Fallon, Nev.....	J. F. Richardson.....	G. B. Snow.....	Miss E. M. Simmonds.....	P. W. Dent.....	San Francisco, Calif.
North Platte.....	Mitchell, Nebr.....	Andrew Weiss.....	L. H. Mong.....	V. E. Hubbell.....	Brooks Fullerton.....	Mitchell, Nebr.
Okanogan.....	Okanogan, Wash.....	Calvin Casteel.....	W. D. Funk.....	W. D. Funk.....		
Orland.....	Orland, Calif.....	R. C. E. Weber.....	C. H. Lillingston.....	C. H. Lillingston.....	P. W. Dent.....	San Francisco, Calif.
Rio Grande.....	El Paso, Tex.....	L. M. Lawson.....	C. A. Peavey.....	L. S. Kennicott.....		
Riverton.....	Riverton, Wyo.....	H. D. Comstock.....	R. B. Smith.....	Henry Berryhill.....	Brooks Fullerton.....	Mitchell, Nebr.
Salt River ¹	Phoenix, Ariz.....	C. C. Cragin ²				
Shoshone.....	Powell, Wyo.....	L. H. Mitchell.....	W. F. Sha.....	Mrs. O. C. Knights.....	E. E. Roddis.....	Helena, Mont.
Strawberry Valley.....	Provo, Utah.....	W. L. Whittemore.....	H. R. Pasewalk.....	W. C. Berger.....	J. R. Alexander.....	Montrose, Colo.
Sun River.....	Great Falls, Mont.....	G. O. Sanford.....	H. W. Johnson.....	F. C. Lewis.....	E. E. Roddis.....	Helena, Mont.
Umatilla.....	Hermiston, Oreg.....	H. M. Schilling.....	G. C. Patterson.....	Miss M. G. Valentine.....		
Uncompahgre.....	Montrose, Colo.....	L. J. Foster.....	G. H. Bolt.....	F. D. Helm.....	J. R. Alexander.....	Montrose, Colo.
Williston.....	Williston, N. Dak.....	W. S. Arthur.....	W. S. Arthur.....	H. C. Melaas.....	E. E. Roddis.....	Helena, Mont.
Yakima.....	Yakima, Wash.....	J. L. Lytel.....	R. K. Cunningham.....	J. C. Gawler.....		
Yuma.....	Yuma, Ariz.....	P. J. Preston.....	C. A. Denman.....	E. M. Philebaum.....	P. W. Dent.....	San Francisco, Calif.

Large Construction Works

Minidoka, American Falls	American Falls, Idaho.	F. A. Banks ³	H. N. Bickel.....	O. L. Adamson.....	B. E. Stoutemyer.....	Boise, Idaho.
Umatilla, McKay Dam.	McKay Dam, Oreg.....	R. M. Conner ⁴	C. B. Funk.....	W. S. Gillogly.....		
Yakima, Tieton Dam..	Rimrock, Wash.....	Walter Ward ¹	V. G. Evans.....	C. F. Williams.....		

¹ Project operated by Salt River Valley Water Users' Association

² General Superintendent and Chief Engineer.
³ Construction Engineer

⁴ Superintendent of Construction.

The NEW RECLAMATION ERA is issued every month by the Bureau of Reclamation of the Department of the Interior, Washington, D. C. It is printed by the Government Printing Office, Washington, D. C.

The NEW RECLAMATION ERA is sent regularly to all water users on the reclamation projects under the jurisdiction of the bureau who wish to receive the magazine. To other than water users the subscription price is 75 cents per year, payable in advance. Subscriptions should be sent to the Chief Clerk, Bureau of Reclamation, Washington, D. C., and remittance in the form of postal money order or New York draft should be made payable to the Chief Disbursing Clerk, Department of the Interior. Postage stamps are not acceptable in payment of subscription.

“WE must know what water is worth. We must know what land will be worth with water on it. We must know what the human unit is worth, and whether the man who goes on the land has not only a little capital, but the energy and the willingness to stick. We must know what best can be produced and where the markets are. We must know the causes of success. We must know the explanation of failure. Solvency can be better assured than ever in the past by better selection of settlers, better stock, better tools, more scientific methods, more attention to distribution and marketing, and more of the spirit of independence in people on the land.”

*ELWOOD MEAD,
Commissioner, Bureau of Reclamation.*

NEW RECLAMATION ERA

VOL. 15

SEPTEMBER, 1924

NO. 9



FRIENDS

IRRIGATION is a many-sided subject. The heavy drafts which it makes on scanty water supplies and the close relationship which it bears to other uses of water call for wise legislation and efficient control on the part of State governments in the granting and protection of water rights and the equitable distribution of water supplies. These comprise the legal and administrative features of irrigation.

Again, enormous quantities of water have to be annually stored in the mountains, pumped from wells, diverted from torrential streams, conveyed around hills and across valleys, and finally delivered to farmers. The accomplishment of so great a task calls for high ability and broad experience on the part of engineers in designing and constructing the needed works, and these constitute the engineering side of irrigation.

Then there is the agricultural side of irrigation which transcends all others in importance, in that it deals with the production of profitable crops. All other phases of irrigation are but means to an end. The one great purpose is to transform desert places into gardens and orchards where the highest type of American citizens may establish homes. Lastly, running all through the subject like threads in a fabric, are to be found such features as proper organization, cooperation, good management, and profitable returns. These may be grouped under the economic side of irrigation.

From "USE OF WATER IN IRRIGATION"

By SAMUEL FORTIER

NEW RECLAMATION ERA

Issued monthly by the Bureau of Reclamation, Department of the Interior, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 15

SEPTEMBER, 1924

No. 9

PLAN OF SETTLEMENT FOR AN IRRIGATION PROJECT

George C. Kreutzer, Director of Farm Economics of the Bureau of Reclamation, points out how many of the difficulties of project settlement may be overcome

THE settlement of an irrigation project should be carefully planned beforehand. The kind of farming that can be safely followed, the price that can be paid for land and water, the capital a settler should have, and, in fact, a general economic analysis of the project should be made before the major works are constructed. Therefore a project should be economically sound and socially desirable.

A fair measure of success can only be expected when the settler's capital and labor are intelligently directed on land that will produce a fair income. Fixed charges, operation expenses, interest on investment, and borrowed money, and a fair living must be made from the direct or indirect sale of products from the soil or the economic conditions must be changed surrounding the particular farm unit.

Moreover, settlers should be carefully selected on the basis of their capital and experience. Only those possessing intelligence, thrift, and energy can be safely taken as settlers. Agricultural experience is a great asset. It is not necessary that he know most of the details of the kind of farming he intends to follow, but that he understands the fundamentals and realizes that even though farming is made up of hard work, still it is a happy and desirable occupation.

And, finally, when the desirable settler is located on a satisfactory piece of land, economically sound, that the administration and management extends to individuals, based on the merits of each case, such guidance and advice and help as to assist them over the rough places until their ventures have proven successful.

SOIL AND TOPOGRAPHIC SURVEYS

Before canals are built and drainage ditches are established an accurate soil survey should be made. This, together with a topographic survey, will determine

the size and shape of the various farm units. When this has not been done and farm units have been established and canals built, the soil survey should be made notwithstanding. When soils are

1. Soil classification and topography should be the basis of valuation, size, and shape of farms.

2. Careful selection of settlers increases chances of success and minimizes difficulties.

3. Employment of competent adviser desirable in order to—

(a) Help settlers work out sound agricultural programs.

(b) Assist settlers with design and location of farm buildings.

(c) Find markets for products.

(d) Counsel with settlers in forming necessary cooperative enterprises.

(e) Advise as to crop production, care and management of livestock and irrigation practices.

4. Grading and preparing land in advance of settlement or parallel with settlement to bring farms into early production can be done better and more cheaply by the colonization agency than by the inexperienced settler.

5. Provision for loans to settlers to bring the development of their farms to a paying basis saves time and reduces failures. Loans should be secured and supervised.

6. Administration should be firm but sympathetic. Management should always fulfill its promises and, likewise, insist on settlers fulfilling theirs.

uniform it may be done rapidly and with little expense. It indicates the kind of agriculture that can be followed successfully and determines very largely the productive value of the land. It thus avoids costly mistakes.

DEVELOPMENT OF FARMS

Following the soil survey a careful study of the cost of preparing the land for irrigation and equipping it with buildings, implements, and livestock should be made to determine within reasonable limits what capital a settler should have, together with available credit, to bring the land into production to such a degree as to make a living for the settler and his family, to provide payments for water and other fixed charges, and still make a reasonable income for future improvements. This information determines what kind of settlers, by capital and experience, are most likely to succeed.

OBTAINING AND SELECTING SETTLERS

If there is considerable land to be settled, advertising, setting out truthfully the opportunity offered, should be done in distant communities from which a reasonable amount of business may be expected. To some points a good man may be sent to speed up settlement and establish temporary offices to give to intending settlers correct and needed information. It is often more satisfactory to give settlers information in this way than to have them individually make long trips only to find that they haven't capital or experience enough to succeed. It may thus eliminate many who are unsuited. A good settler should possess capital and experience, and realize that to develop an irrigated farm requires hard work, careful living, and husbanding of resources seldom found in other occupations.

AGRICULTURAL ADVISOR

No farm should be granted to an applicant unless it has been inspected by him first and whenever possible by his wife also. It avoids disappointments. On each project there should be an officer who is fitted by training and experience to give to the new settler guidance and advice. This officer must be carefully

ADVICE AND SERVICE TO NEW SETTLERS IMPORTANT

Competent advisers can be of material help to settlers in working out sound agricultural programs, finding markets for products, and assisting in formation of cooperative enterprises

selected. If he is unsuited for his position the project would become chaotic.

Before a farm is sold this officer and the prospective settler should work out an estimate of what it will cost to develop the farm and make a reasonable plan of procedure for the particular settler to follow, taking into consideration his capital, experience, labor in family, and all other pertinent things as related to the settler and the particular farm. He would encourage those likely to succeed to apply and, likewise, discourage the filing of application by those who are obviously unsuited. It is not only safe for him to do this but it is necessary if he is to perform a high public duty.

The plan provided should keep constantly before officers and settlers alike that a farm must be under cultivation to pay. It is not enough to give possession of land to the settler and then allow him to shift for himself. As soon as the settler takes possession the program should be worked out in more detail and guidance should be given him in his expenditures for development and again in the use of available credit to the end that a maximum return be made on the capital and energy expended.

GRADING AND LAND PREPARATION

Finances will not always permit the grading of land, building of farm ditches, and all necessary land preparation preparatory to receiving the seed in advance of settlement on all projects, but where it can be done the settler receives an early return that can not be provided for in any other way. It also means that settlers can be taken with less capital if this is done by the project management, and the work granted as loans, to bear interest and be surrounded by conditions of repayment suited to their character.

REPRODUCTIVE IMPROVEMENTS

While it is realized that a settler must house his family comfortably, still the maximum amount of capital must go into land preparation, outbuildings, seed, and the purchase of livestock and equipment. Too often a large share of the capital is tied up in a house, leaving too small an amount for reproductive improvements. Newcomers need this advice to insure that the development is proceeding along sound lines so that both capital and labor shall become producing at the earliest possible time.

Officers of training and experience can make these plans and estimates. They must be based on average yields for

the particular soil, produced at average cost and sold for average market prices. This ground work eliminates persons who would be weak settlers. It eliminates the selling of land that is unsound and encourages the settlement of sound land by worthy people. When well done it creates confidence in the development agency and brings about a spirit of cooperation between the settlers and the project difficult to attain in any other way. Why? Because it is service of the highest character.

SERVICE TO SETTLERS

Service should be extended to the settler to see that his ditches are located and constructed properly, cheaply, and to best serve the farm in question. It should contemplate future drainage. Assistance should be given the settler in planning his buildings to utilize local materials if cheap, and provide a farmstead layout that is both efficient and attractive and at the same time get the settler the most for his limited dollars. Settlers should be guided as to the growing of crops known to do well locally. They can not afford to experiment.

Some settlers succeed almost from the beginning. Others are less fortunate and will need much of this service and attention. To those in the latter class advice and direction must be more intensive. Programs of operation, both agricultural and financial, should be made with their cooperation at intervals as frequent as once each six months until they become successful.

UNSUITABLE SETTLERS

Even with this care some will not succeed and the earlier this is determined in each individual case the better for all concerned. Those who can not succeed should be encouraged to sell at a fair price before they have lost all and an effort made to obtain new settlers in their places. In such cases the advising officer can be helpful to both—in the first case to see that the one selling obtains a fair price and in the second to see that the new settler pays only what the farm is worth.

COOPERATIVE MARKETING

The advising officer on each project should counsel with the settlers in the formation of their cooperative enterprises. He can obtain the assistance of officers of the agricultural colleges and the United States Department of Agriculture. Cooperative marketing is a good thing when founded on sound economic principles and

when well managed. Settlers should be encouraged to form one cooperative association from the first. It should be an association through which early cooperative purchases and other simple transactions may pass as well as being an institution to serve them socially and educationally. It should not incur debt and should therefore keep on a strictly cash basis. Later it can divide up into business groups as the industries of the community develop, such as dairymen, poultrymen, etc.

LOANS TO SETTLERS

Few projects will have money to loan to settlers; still it is a very desirable feature. There is no instrument of credit so effective as a supervised loan, a loan backed by adequate security and the money carefully expended on a prearranged program. It eliminates speculation. If projects can not provide such credit, then settlers must have more capital, and settlers with satisfactory capital are scarce.

FARM LABORERS

A provision should be made on the project for a limited number of farm laborers. They should be given from 2 to 5 acres of land under the same terms that farmers obtain their land. On the Durham project, Calif., 30 farm laborers were provided for 120 farmers and it seemed to provide employment enough for the laborers. This ratio will vary. The more thrifty soon develop into farmers and make another source of getting settlers. Because they are buying such a small area of land their payments will be made promptly.

ADMINISTRATION

The administration of the settlers should be firm but sympathetic. Settlers should be made to realize from the first that they must pay for their land and the water right attached to it. There will always be delinquencies and each one must be dealt with on its individual merit. General movements of repudiation should be handled firmly and with dispatch right from the start.

The plan as outlined is not a panacea, but is a better way of doing it than is generally put into operation. Under such a plan settlers of industry, character, and energy, together with reasonable capital, can and do succeed. While much is herein provided, still the individual must do his part. People who succeed must keep their noses to the grindstone; settlers are no exception to the rule.

FOREIGN LAND POLICIES POINT WAY FOR PROJECTS

Essential features of land policies of other countries summarized in report of Commission on Land Colonization and Rural Credits of the State of California

SINCE the beginning of this century Great Britain, Denmark, Norway, Sweden, Germany, Russia, Austria, Italy, the six Australian States, New Zealand, British and German South Africa, Brazil, Venezuela, and Uruguay have either adopted or greatly extended a land-settlement policy which aims to give settlers homes at the least possible cost and also to finance the settler who is a good moral risk, so as to enable anyone who is frugal, industrious, and ambitious to own a home. The essential features of these systems are summarized as follows in the report of the Commission on Land Colonization and Rural Credits of the State of California:

Small initial payments.—The first of these essentials is a provision for enabling farmers to enter into possession of land with only a nominal payment, thus leaving the greater part of their capital available to pay for improvements and equipment.

Organized construction of farm improvements.—The second is the creation of an organization, either State or private, to make the necessary improvements, such as houses, stables, etc., leveling and ditching irrigated land, and providing practical superintendence over the farming operations of beginners to prevent costly delays and mistakes.

Long-time payments for land and improvements.—The third is making the period of payments long enough to enable the money to be earned out of the soil, and having the payments amortized; that is, in small amounts paid annually or semiannually rather than in a lump sum; also securing for the settler, usually through the use of the State's credit, loans of money needed for improvements at low rates of interest.

Practical advice and supervision for beginners.—The fourth is the employment of capable business men fully informed regarding prices of farm equipment and farming operations in the locality to give advice to inexperienced beginners or farmers from other sections of the country who do not know what crops to plant or how they should be cultivated.

This local director of a colony can be of great service in bringing about cooperative arrangements in buying and selling. It is part of his duty to watch the operations of colonists so as to be able to inform those who are responsible for extending credit which colonists are industrious and trying to succeed and which



Yuma project cabbage and onions

are idle and impractical. Such supervision is an essential feature of any system which gives generous personal credit.

This State-aided settlement has everywhere been remarkably successful. It was inaugurated to enable men who had industry and thrift, and little else, to become landowners. At the outset men predicted that it would entail heavy costs to the taxpayers. But, on the contrary, the conditions of payment have been so

well adjusted to the profits of agriculture that in nearly all countries State-aided settlements have been self-supporting, and in some cases they have earned a profit. They have, moreover, revolutionized rural conditions. The statements of the Canadian commission about the effects of the New Zealand system on rural life indicate equally well the effects of the systems of Ireland, Denmark, Germany, and practically all the other countries in which State aid in land settlement is in practice. The statements of the commission follow:

"With money available on terms suitable to the industry, the farmers have built better houses or remodeled their old ones; brought a large acreage of land under cultivation that would otherwise be lying idle; have bought and kept better livestock; have bought and used more labor-saving machinery on the farms and in the houses; have erected elevated tanks and windmills; have piped water to their dwellings and to their outbuildings; have irrigation for their vegetable and flower garden around the houses; and have increased their dairy herds. They keep more sheep and pigs and have so largely increased the revenue from their farms that they are able to meet the payments on the mortgages and to adopt a higher standard of living, and a better one."

VICTORIA, AUSTRALIA

Renders the following assistance to settlers in the grading of land:

1. It rents settlers grading tools at the nominal charge of 60 cents a day, thus saving the settler a large expenditure in these implements.

2. It furnishes at a nominal cost contour plans showing the direction of the slopes, thus enabling the settler to tell how his land should be graded.

3. It grades a part or the entire farm in advance of settlement, and adds the cost of this to the price of the land.

The settler, therefore, has the option of either doing his own work or of taking a block where a part of the work has already been done.

DEVELOPMENT OF IRRIGATION IN SOUTH AFRICA

Many of the difficulties encountered by the water users on the irrigation projects of the Bureau of Reclamation are paralleled in South Africa, where a new era is also dawning

IN a recent issue of the Midland News and Karoo Farmer, published at Cradock, Cape Province, South Africa, the writer of a series of articles on the subject of the development of irrigation in that country concludes with a prediction that the new era is full of promise and urges that petty recriminations must be a thing of the past and that settlers must be aided in their early efforts. The following extracts are from the concluding chapter:

That irrigation has not yet proved itself to be the success that was anticipated can not be denied. Did it prove an immediate success in other countries? For many years it was a dream; now it has passed from a dream to a reality, but it has forged a new link in the chain of progress. It is not difficult for an unprejudiced mind to admit the reasonableness of the claim that no Government could have done more to aid the growing development, supported as it has been by a loyal and hard-working staff of engineers. The new era which is dawning and which was so well outlined by the Honorable the Minister of Lands at the Irrigation Congress in Johannesburg, for the settlement of lands already under irrigation and the cessation of the program of large construction until such time as this has been done, is full of promise.

Mistakes have been made in the past. No one is free from blame entirely, but the mistakes have been honestly made both by the Government, engineers, farmers, and settlers. Proof has been furnished with painful frequency that the areas held by individual owners are too large for development by them with the limited means at their disposal. The long-cherished hope of speculation in land at the expense of the State has departed; with it we see a great cry going up to the Government to help, which has not been in vain. It is to be hoped now that the Government has stated its intentions the individual will be able to concentrate on the development of such limited area as he can personally supervise, and that the State will take over the balance of the land at its true value and assist in settling it. The mere constructing of irrigation works does not increase the true value of land; it does, however, increase its possibilities.

It has been deplorable to note how for some time past there has been a growing tendency to blame the Government and their officials for the failure to do what now may appear obvious, but has only become so in the light of experience.

Can anyone deny that the many local and parochial differences of opinion between those who have been intrusted with the carrying out of cooperation

schemes with State funds, to say nothing of the petty recriminations among the users of water, have retarded the progress of land settlement under irrigation schemes and driven away many of those whom it is most desirable to see settled in the fertile valleys of the Midlands and Eastern Province? Read what the liquidators of an important irrigation settlement say in their report:

"One thing is certain, that unless settlers and others cease harping upon the past and realize that recriminations do not improve the general prospects of those interests, but instead devote themselves to making a success of their various undertakings, the ultimate success of the irrigation scheme and the prosperity of the settlement will only be delayed thereby, and the people who will derive the benefits may not be the present holders, but their successors."

In conclusion, the following remarks by Dr. Elwood Mead, than whom no one has a greater right to speak with authority, may be of interest:

"It is too much to expect the average settler unaided to bridge the gap between raw land and farm that will support him; financial or engineering aid, sometimes both, are needed.

"As carried out by the Government or ordinary private enterprise, even our most complete irrigation projects do not clear the land, level it off into suitable checks, and throw up borders; laterals and boxes are not put in; nor are the best methods of irrigation determined and laid out. But all these detailed improvements, which have to be made before the first crop can be seeded, are quite as essential to the success of the new settler and are often more costly than the canals and reservoirs themselves.

"It is, therefore, most unwise to leave all this work, which is not farming, but rather engineering, for the inexperienced settler. In his hands it is likely to cost twice what it would, and at a time when there is no income from the land the necessity for any considerable outlay may spell failure for the individual. It is men with small capital who are more often attracted to the irrigation projects, and these are the men we must continue to attract by making the farming of such land a venture within the reach of limited capital."

Once a month, twice a month, or even every week or day in some cases, the dairyman receives payment for the work his cows have done for him; and cows do not work on an eight-hour-day basis either.



Drying fruit, Uncompahgre project, Colorado

SOUTH AFRICAN ACT NEEDS CHANGES

THE report of the South African fact-finding committee, appointed recently by the Minister of Lands to visit various centers in the Union and to take evidence of interested persons "for the purpose of reporting to him on any amendments that may be necessary" to the irrigation act of 1912, has just been made public. There is a striking parallel between their findings and those of the committee of special advisors on reclamation appointed by the Secretary of the Interior, as shown by the following extracts from the report, as printed in the South African irrigation department magazine of June, 1924.

"In our opinion there are three essentials in regard to which there should be definite information before works for an irrigation scheme are embarked upon. These are—

"(a) The extent of the land suitable for cultivation which will be commanded by the proposed works.

"(b) The quantity of the water which will be available, and to which the irrigators will be legally entitled, for irrigating such land; and

"(c) The cost of the works.

"The act does not make proper provision for this, and from the evidence given it is clear that many of the existing irrigation districts were constituted on very scanty information in regard to these matters, and that the boards subsequently elected for them proceeded, under the wide statutory powers enjoyed by them, to construct and complete works based upon this scanty information only to find in many cases that much of the land scheduled as irrigable was unsuitable for cultivation, and/or that the water available was insufficient for the scheme, and/or that the estimated cost had been greatly exceeded. This has not only proved disastrous to many irrigators but has also resulted in a loss to the Government in some of the cases financed by it. It is highly desirable that the act should be so amended as to minimize the risk of this happening in the future.

"One way in which this risk might be obviated is to provide, on approximate information, for the establishment of provisional irrigation districts with provisional boards for purposes of investigation only and with limited powers of expenditure. Such boards should—

"(1) Collect information as to available water supply; extent and cost of proposed works; extent of land suitable for irrigation.

"(2) Inquire into and ascertain the water rights of the irrigators as a whole and as between themselves; and formulate proposals for the equitable distribution of the water and for payment of compensation to irrigators for existing rights or works, whether in the form of differential rates or otherwise.

"(3) Draw up a schedule of irrigable land, divide the district into areas for differential rating where necessary, and fix approximate rates for the respective areas.

"Our attention was drawn to the unlimited spending powers possessed by irrigation boards. These boards frequently, without any reference to their ratepayers, spend money, not only far in excess of the original estimated cost of the work to which the ratepayers had agreed, but also on other works and matters. We would recommend that some provision be made for protecting ratepayers in this regard. They should, for instance, be consulted if during the early stages of the work it is discovered that the cost of the scheme will be much greater than had been anticipated. It may at that stage be in their interest to pay what has been spent, and abandon the scheme. They should at any rate in such a case be given an opportunity to say whether they wish to go on with the scheme or not.

"In many cases big schemes have been embarked upon without sufficient investigation and owe their failure, or indifferent success, to that. It seems to us also that it has not been sufficiently realized yet that any big scheme, carrying heavy irrigation rates, is dependent for its success, not only upon the superior quality of the land commanded by the scheme, but also upon the intensive cultivation of such land, and the facilities which exist for the disposing of the products of the lands. We are of opinion that greater benefit will be derived from big schemes if steps are taken to insure that in future big schemes, supported by Government loans, will not be embarked upon until proper preliminary investigations have been made in regard to the extent and the quality of the land, the sufficiency of the available water, the cost of the scheme compared to its productive capacity, etc., and provision has been made guarding against the owners under the scheme holding more land than they can reasonably be expected to cultivate beneficially or holding any land merely for speculative purposes."

The dairy farmer is enabled to pay cash for things he buys and is free to "stand from under" when hard times threaten.

Crops may be harvested by livestock economically when the quantity trampled down and the injury to the soil do not exceed the cost of harvesting by hand.



Oat field, second year in cultivation, Minidoka project, Idaho

CANADIAN POINTERS FOR RECLAMATION PROJECTS

This summary of legislation providing for farm loans and rural credits in the Provinces of Canada may prove suggestive in connection with the remedial legislation recommended for our reclamation projects

(This is the second of a series of articles dealing with the aid which Canada gives her settlers in establishing homes on the land. The first was published in the August issue of the NEW RECLAMATION ERA.)

MANITOBA

THE Manitoba farms loans act of 1917 authorizes the Manitoba Farm Loans Association to make loans to persons residing or intending to reside on lands within the Province. The purposes for which loans may be made under the act are for—

(a) The acquiring of land for agricultural purposes, and the satisfaction of encumbrances on land used for such purposes.

(b) The clearing and draining of land.

(c) The erection of farm buildings.

(d) The purchase of livestock and implements.

(e) The discharge of liabilities incurred for the improvement and development of land used for agricultural purposes.

(f) Any other purpose calculated to increase land productiveness.

(b) No loan may exceed \$10,000 to any borrower.

(c) All advances are secured by first mortgage on the land, and encumbrances have to be removed from the title out of the amount borrowed.

(d) All mortgages shall be for a period of 30 years, but may be paid off at any annual payment date at or after the end of 5 years from the date of the mortgage.

(e) The repayment of all mortgages issued by the association is made on the amortization plan; that is, the entire amount—principal and interest—is spread over the period of 30 years, and is repaid by means of an annual fixed payment.

(f) The rate of interest to the borrower is 7 per cent per annum. An annual payment over a period of 30 years, for a \$1,000 loan, at the rate of 7 per cent per annum, taking care of principal and interest, is \$80.60.

Although sympathetic consideration is given by the board to the struggling settler in remote districts, all applications for loans are treated upon their merits, based upon the value of the property as

dividual shareholders to obtain short-term loans for the purpose of carrying on or extending their farming operation. The main principles indorsed by the act are:

(a) A lower and a fixed rate of interest, namely, 7 per cent per annum.

(b) Credit based on the needs of the farmers and for farmers only.

(c) Local self-government.

(d) The development of a cooperative and a community spirit.

Fifteen or more farmers in a district may apply for permission to be incorporated as a rural credit society. The Government then grants a charter and appoints an organizing secretary, whose duty it is to obtain a minimum of 35 farmers to subscribe for a limited share of \$100 each, of which 10 per cent must be paid up. The rural municipality then subscribes for the amount of one-half of what the individual farmers subscribe, also paying 10 per cent, and the province subscribes on the same basis as the municipality. The unpaid balance of the stock is subject to call by the directors. Societies are generally formed on the basis of 50 farmer members.

Upon approval of the directors, loans are granted for the following purposes:

(a) The purchase of seed, feed, or other farm supplies.

(b) The purchase of farm implements and machinery.

(c) The purchase of cows, horses, pigs, sheep, and other domestic animals.

(d) To defray the cost of carrying on farming, ranching, dairying, etc.

(e) To meet the cost of preparing the land for cultivation.

(f) For the erection of silos.

As a general rule all loans are repayable on or before December 31 of the year in which they are granted. Loans for breaking new land and for summer fallowing are renewable at the discretion of the directors, so that a crop can be raised from such land before the loan has to be repaid. Loans for the purchase of stock can be carried for a period of one to three years. Where crops have failed the loans are renewable at the discretion of the directors.

(To be continued)



An Uncompahgre project apple orchard

The conditions governing the granting of a loan are that—

(a) The amount loaned to any applicant may not exceed 50 per cent of the value of the land together with the improvements thereon, as appraised by the association's inspector.

inspected or in the event of forced sale and upon the personal character and energy of the applicant.

In 1917 the Manitoba rural credits act was passed, providing for the organization by Manitoba farmers of rural credit societies. Such societies enable the in-

Through cooperative creameries and cheese factories, farmers can supply a staple, finished product, ready to be disposed of direct to the ultimate consumer if necessary.

PICTORIAL LESSONS IN PRACTICAL RECLAMATION

LESSON NO. 7



Harrowing land on the Belle Fourche project, South Dakota

AS is the case with all farm implements, the harrow has its uses and abuses. If harrowing is done at the right time and with the proper soil conditions the results are highly profitable, but harrowing at the wrong time or with improper soil conditions would better be left undone. When the soil is just right for harrowing every effort should be made to hurry the work. If ground is harrowed when too wet the same damage as in plowing wet ground results. The soil is in part "puddled" and its condition to help plant growth destroyed. Likewise there is a condition of dryness of the soil when it is lost labor to harrow. Working up a very fine, dusty, and drifting top soil is not an aid to moisture retention, but aids the drying out of the soil. If soil is plowed in right condition, following the plow as quickly as possible by the harrow is very beneficial. Also the use of this implement following rains to break up crust formation and maintain the soil mulch gives good results. A light harrowing at the time such crops as corn, potatoes, beets, grain, etc., are coming through the soil surface serves the double purpose of aiding an even crop stand and destroying weeds that are at the proper stage of growth for destruction by the harrow. The harrowing of such crops, however, should not be done very

early in the morning or at times when the plants are crisp and easily broken by harrow teeth. On the other hand, when harrowing plowed ground to kill young weed growth, try to pick out days that are cloudy or utilize the early mornings, as the weeds will be more effectively damaged.

The theory of the use of the harrow is to stir rather than turn the soil. This stirring is particularly beneficial in that it introduces air into the soil, thereby warming it and encouraging the action of the plant-promoting agents in the soil.

DAIRY PRODUCTION NOT ENTIRE GAIN

On the Newlands project, Nevada, production records have been kept for a considerable number of dairy cows. The sum of money those animals bring to the project and to the settlers, monthly or yearly, from the sale of dairy products is the feature likely to be stressed most. That is the spectacular feature, and it is certainly an important one, but back of that, more fundamental, and in the long run more important, is the fact that thousands of tons of manure are each year being poured back into the soil, conserving fertility, improving the physical state, and increasing crop yields.

Meadows, pastures, and hay fields become "hidebound," a condition which is relieved by timely use of the harrow, preferably in the spring, just when the growth is starting. Of course, special implements for this work are manufactured, but in the absence of such special implements you can get results from the peg-tooth harrow, the spring-tooth harrow, or the disk.

The harrow as now constructed is so arranged that if properly hitched the teeth will not follow each other or "track." If the teeth do "track" change the hitch, as you are not really harrowing unless each tooth stirs its own particular strip of soil.

Do not be discouraged if your field looks worse after harrowing than it did before the work. The harrow has a way of dragging clods to the surface and of letting the fine soil down to the seed bed proper where it is needed. A clod on top of the ground is far less dangerous than one a few inches under the surface.

The great advantage of the harrow lies in the simplicity of its construction and use. If you can not afford to buy a modern steel harrow you can follow the example of your forefathers and make an **A** harrow which will do good work and last for years.—I. D. O'Donnell.

RECORDS
OF FEED CONSUMED
AND MILK PRODUCED
TELL WHICH COWS
ARE THE
GOOD PRODUCERS



HOGGING DOWN CORN
IS A MEANS OF CUTTING LABOR COSTS
IN FEEDING OPERATIONS

THE
ULTIMATE DESTINATION
OF
MOST MEAT ANIMALS
IS THE STOCKYARD
THE QUALITY OF STOCK
WHICH IN TURN
DEPENDS CHIEFLY
ON BREEDING AND FEEDING
IS A
LARGE FACTOR
IN THE
SELLING PRICE.



IMPROVING LIVESTOCK FEEDING METHODS

HOW TO IMPROVE LIVESTOCK FEEDING METHODS

The balancing of rations, more liberal and regular feeding, and the use of legumes are the chief means used by livestock owners to improve feeding methods

(Note.—The following article was prepared especially for the readers of the *NEW RECLAMATION ERA* by the Bureau of Animal Industry, United States Department of Agriculture.)

THE feeding of farm animals is a problem which for years has received study from many sources. Livestock owners naturally have tried different feeds and have come to various conclusions concerning their value. Experiment-station investigators have made tests of a more comprehensive nature under controlled conditions. Chemists have studied the composition of feeds with reference to nutritive ingredients, digestibility, and other qualities. Feed manufacturers, likewise, have worked on the problem from a commercial standpoint.

There are many excellent books and State and Government bulletins on the subject. Thus it is clear that there is no lack of information on the feeding of farm animals.

CURRENT FEEDING PROBLEMS

Judging, however, from a questionnaire conducted last year by the United States Department of Agriculture, a number of serious feeding problems still confront livestock owners. These problems, as discussed by farmers themselves, indicate some uncertainty as to the best means of applying the abundant information on the subject of feeding.

The purpose of this brief article is to point out some of the more common mistakes made in feeding and to mention briefly how progressive farmers are improving their methods of feeding their stock. The most serious problem in livestock feeding, according to replies by farmers to a series of questions asked by the Department of Agriculture, is that of producing or obtaining feeds economically. In the experience of 457 livestock owners, the general economy of rations represented more than half of all feeding difficulties. The cost of grain, or more specifically the cost of protein, was the problem that most of the farmers had difficulty in solving. The question of balanced rations was the next most important. These results show a rather widespread interest in the economic question of making the outlay for feeds balance the returns received from the sale of animals or products marketed.

A Wyoming farmer of long experience stated that his most difficult feeding

problem was that of growing grains locally for his grain mixtures. This farmer remarked, in addition, that he had brought about feeding economies by a more careful selection of his breeding stock, with the result that a larger proportion of the offspring were better producers. "By rigidly culling all nonproducers and irregular producers," he explained "and all constitutionally weak and undersized animals in all classes, I have succeeded in getting 100 per cent producers of all stock, with the exception of young stock being bred for the first time."

A hog raiser of 12 years' experience stated that he had improved his feeding methods by hogging down crops and is now trying specially sown pasture crops. His purpose is to raise more legumes, such as vetch, soy beans, and cowpeas. Commenting on silage, he says, "I could scarcely get along without it for milch cows and growing cattle."

Items which are involved in feeding problems, as reported by nearly 500 farmers, are labor difficulties, wintering stock successfully, short pastures, and variety and palatability of the feed.

PRACTICAL MEANS OF IMPROVEMENT

The chief means of improving methods of feeding domestic animals as practiced by progressive farmers is the balancing of rations. The purpose of such rations, of course, is to combine feeds properly so as to obtain better results in proportion to the cost. Farmers in the Middle West took a particular interest in the question of balancing rations. A Colorado stockman stated that formerly he had been in the range-cattle business but that he is gradually turning to the production of purebred cattle both of the beef and dairy type. He is planning to produce baby beef with his beef stock and gradually to build up a dairy herd. He attributed "lack of knowledge" to be the chief cause of feeding difficulties. In discussing improvements in his methods he states, "I used to feed alfalfa, but now I feed grain with alfalfa." This farmer requested that the department furnish him with bulletins on better feeding, which, of course, was done.

A summary of methods of improving feeding practices, based on the reports, is as follows; the items are arranged in order of their importance: (1) Using balanced rations; (2) more liberal feeding; (3) feeding more legumes; (4) better water supply; (5) giving minerals to live-

stock; (6) feeding according to production; (7) feeding more protein; (8) more regular feeding.

IMPROVED STOCK MOST EFFICIENT IN USE OF FEEDS

A rather surprising result of the inquiry as reported by nearly 500 stockmen is the ability of improved livestock to help solve feeding problems. Most of the persons contributing the experiences on the subject had raised purebred, grade, crossbred, and scrub stock at various times and were in a position to make comparisons. There was almost unanimous agreement on the better results obtained in feeding improved stock. The comments were an answer to the question, "Do you find that livestock of improved breeding make greater gains or produce more than scrubs or common stock when fed in the same way?" The average superiority reported for the improved stock was 39.6 per cent over common stock. Improved stock, of course, is more likely to receive somewhat better feed and care, yet good stock and good feed and care so commonly go together that the per cent given is about what others may expect when they improve their herds by use of purebred sires and good breeding practices.

A South Dakota farmer told of selling grade steers on the Omaha market for \$55 more per head than scrubs raised with them. Another farmer discussed a feeding test in which he kept well-bred cattle and scrubs in the same feed lot. "The well-bred cattle fattened," he explained, "while the scrubs remained poor." In this connection it is interesting to consider the experience of persons who reported poor results with good stock. Of nearly 500 experiences only 5, for one reason or another, had failed to succeed with well-bred herds and flocks. This is only about 1 per cent, which points to a 99 per cent probability that purebred and other improved livestock will aid greatly in solving feeding problems.

FEEDING DAIRY COWS ACCORDING TO PRODUCTION

Among other interesting results likely to be helpful to persons on reclamation projects is the matter of feeding dairy cows according to production. About four-fifths of dairy cattle owners reported that they feed their stock according to production. This proportion indicates the value

(Continued on page 142)

CELERY GROWING ON THE LOWER YELLOWSTONE PROJECT

P. F. Blake, of Sidney, Mont., on the Lower Yellowstone project, has specialized on the raising of celery, and writes of his results for the benefit of other water users

MY interest in celery growing began 17 years ago when, up in Madison County, I saw a few bunches of celery growing beside a little mountain stream. The next year, in my own garden, I set about 150 plants in a light soil located so it could be irrigated at pleasure, and succeeded in growing celery of good quality and medium size.

The next year I came to the Lower Yellowstone where the canal was being completed and secured the use of a parcel of ground within the Sidney townsite containing about half an acre where I grew a general garden with some success.

I always believed in fertilizer for garden, so had 10 loads of good farmyard manure put on this ground. Water was available the following season and I tried celery, getting two dozen plants from the greenhouse rather late in the season, and setting them in the regulation manner in a trench, which was so filled by the heavy spring showers that the young plants had to be dug out repeatedly, and had they not been large plants when set would have been a complete loss. At the end of the season I had celery as good as there was on our local market.

In 1921 I set about 500 plants and grew some celery which found a ready sale at prices of Michigan or coast grown stuff, and the quality was excellent.

The following year I decided to try out celery on a commercial scale. I arranged for the growing of the plants and set about 5,000. These plants were gotten from the grower in the seed flats and set in a bed in the open garden about May 20 in rows about 4 inches apart and 1½ inches in the row, watered daily, and covered during the hottest part of the day for three days after setting, or longer if the day was likely to be very hot. The transplanting into the permanent rows was begun June 7 and continued through the month, the last being set on the 28th.

An acre of celery contains about 20,000 plants and with careful management at least 75 per cent of these ought to be of marketable grade, selling for about \$1,200, and should be grown for about \$600.

As to profit: Thus far I have been doing much experimenting, so it is hardly fair to compute profits on the work to date, but two years ago I set about one-fourth acre and sold \$320 worth of celery, the expense being estimated at about \$125. The celery sold for \$1.50 per dozen.

The past season I set twice as many plants and sold \$330 worth of celery, the expense being estimated at about \$200. This crop sold at \$1 per dozen.—P. F. Blake, Sidney, Mont.

That crop of celery was the talk of the neighborhood. Samples took first prize at the county fair and third at the State fair, and other samples sent to the Department of Agriculture at Washington were pronounced of good quality and excellent flavor. The first celery was marketed August 21. The market opened slow and the storage question came up. I dug a cellar under the house leaving a dirt floor and more than half of the crop was stored there, some stored in a wide trench in the field, and of course some sold direct from the row where grown.

The past season the spring was late and the first plants were set in the outdoor bed on May 17 and the last on June 4. They were shaded as before for three or four days and yet I note in my record that on May 24 I lost 1,000 celery on account of heat. The first setting was done in the field June 6 and continued till June 25. These plants were set in shallow trenches made with a wheel hoe and about 3 inches deep which did away

with the necessity of digging holes for each separate plant and also enabled me to shade the plants the first three days by laying a 10-inch board lengthwise over the row. I had very small loss at this setting.

I have arrived at the following conclusions:

Almost any soil if handled properly will raise celery, but the heavy soils are more difficult to handle, though the celery seems to have the best flavor on clay soils.

The old method of setting in trenches a foot or more deep will not do in sections where there is likelihood of heavy rains the first four weeks of the growing season.

Shallow trenches are better than level setting, as the setting can be done in much less time and the plants readily shaded. With my short experience I set 300 plants per hour in the field.

Begin banking early and keep the stalks of the plants well together and the dirt well up on them through the season; finish the bleaching with about 4 inches of the tallest leaves above ground.

In sections where the sunshine is occasionally very hot, 90° or more, do not depend on boards for bleaching, as much of my loss this year, especially of earliest celery, was due to the heat burning the leaves that touched or lay close to the boards. This may be avoided by placing the boards far enough apart that 4 to 6 inches of dirt between the board and plant would protect it. The past season was favorable for this method of bleaching, but about 2,000 of my best plants were scorched in three days when nearly ready for market.

Setting in double rows does not pay, as the plants are harder to care for properly and the size is not likely to be satisfactory.

Do not think to gain time by seeding too early, as the plants are more likely to form seed stalks if started too early.

Do not be afraid of early frost, as a freeze that will knock tomatoes completely out will not harm celery if well banked.

Bleaching may be done largely in storage in a common cellar if dark and cool by setting plants close together on the damp floor and covering the roots lightly with damp earth or sand, but do not store the plants wet or sprinkle them in storage.

Celery plants are hardy, not liable to disease, or to damage by insects or hail.

In marketing, the neatness and style of package has much to do with the wholesaler and commission man, while the appearance when unpacked has much to do when it reaches the retailer and consumer.

HOW TO IMPROVE LIVESTOCK FEEDING METHODS

(Continued from page 141)

of the practice from a practical as well as scientific basis. The object, of course, of feeding dairy cows in proportion to what they produce is to give them the quantities of feed which will return the greatest net profit.

In summing up the results it appears that the balancing of rations, more liberal and regular feeding, and the use of legumes are the chief means used by livestock owners to improve feeding methods. Also, well-bred animals make much more profitable use of feeds than common livestock, thereby aiding materially in making

receipts balance costs and leave a margin of profit.

To aid livestock owners who have feeding problems which they are unable to solve, in obtaining the opinions of Federal and State specialists, the United States Department of Agriculture will send to such persons feeding-question sheets which are a convenient means of outlining the problem. The department has recently prepared, also, a small handbook entitled "A Handbook for the Better Feeding of Livestock," which will likewise be sent on request.

SPIRIT OF OPTIMISM NOTED ON UNCOMPAGHGRE PROJECT

T. E. Monell, an old settler in the locality with a record of 30 years' continuous service as county clerk of Montrose County, gives interview to local paper

(From the Montrose Daily Press, July 16, 1924)

I have never seen better crops in the valley in all the years I have lived here than I saw Tuesday in a trip over a portion of the valley, says Tony Monell.

It's a truly wonderful sight, says he, to get out on to the side roads and feast your eyes on the crops. There are few fields of poor crops, for everything is so generally uniform and good.

The large onion acreage is a revelation. They are everywhere and in all kinds of ground and all are good. New onion growers have a wonderful crop, while the old experienced growers have a hundred per cent crop.

Sugar beets are also being grown in every kind of soil and everywhere. Even Spring Creek mesa has been invaded by onions and sugar beets.

Out of 27 fields of sugar beets visited, only two were poor and one fair, the others being extra good.

While the first cutting of hay was spotty, some fields good and some but half a crop, the second crop is coming on uniformly good.

Where the ground was all prepared and leveled, the beets are a hundred per cent crop. They have made a wonderful growth and promise a large tonnage. The beets last year made a gain of per acre yield over the preceding year and this year, says Mr. Monell, they promise

to average 2 tons to the acre better than last year.

While there is a 15 per cent reduction in the potato acreage, the crop stand is so uniformly good and the condition so well nigh perfect that the yield will be heavy. The general average of potato stand is 90 per cent and the general condition is 100 per cent.

Mr. Monell says that the general condition of crops is number one, showing a mighty fine class of farmers who have worked hard to take care of their crops this season. The yields of all kinds of crops will be large and the only thing that can interfere with prosperity will be low prices.

EDITORIAL COMMENT

That was a fine, optimistic story given to us by Tony Monell, after he had taken a short trip over the valley and witnessed the wonderful crops that are being grown in the Uncompahgre Valley this year.

Not only are the crops going to be large and excessively productive but the indications are that they will be very profitable, for prices are going higher all the time, and by fall they will doubtless reach the old-time standard.

There is no reason to feel discouraged in the Uncompahgre Valley, for while we

have discouragements here, they have them elsewhere as well, and we are in no worse fix than other sections. In fact, we are better off than those of other places.

As Judge Bell has truthfully declared time and again, the lands of the Uncompahgre Valley are more productive than those of any other part of the country that he knows, and we have great reason to be happy that we live in a valley that is more favored by fertility of soil than can be found anywhere in the United States.

With our wheat going to reach at least \$1.50 and a large acreage of it; with potatoes indicating a healthy price because of shortages elsewhere; with sugar beets promising a large yield and with the price already fixed at a profitable margin to the grower; with a larger acreage of onions than ever before, which nearly always command a good price; with buyers already on the ground trying to contract for all fruits at higher prices than were paid for several years; and with all other products of the soil in the same condition, it seems to us that the farmer may soon feel he is sitting pretty; and he certainly deserves all that is coming to him.

Montrose and Uncompahgre Valley can look forward to a splendid year. The dark days are rapidly passing again.



About 40 per cent of the cropped area on the projects is in alfalfa, capable of supporting large numbers of dairy cattle

CROP CONDITIONS ON THE PROJECTS

JULY, 1924

Yuma project, Arizona.—Crops in general were in very good condition and the outlook for large yields was promising. Threshing of alfalfa seed was in progress. The yield was unusually heavy, amounting to about 350 pounds per acre, and the price ranged from 15 to 18 cents per pound. Orchards on the mesa continued to develop in a very satisfactory manner. The general attitude of the farmers and business men was optimistic.

Orland project, California.—Gathering of the almond crop was well started during the latter part of the month, and from one-half to two-thirds of a normal yield was expected. Damage from drought to alfalfa will probably be limited to coarse, gravelly areas as the stands on more compact soils were not materially affected. Young orchards were being watered by tank wagons and older orchards from wells installed by owners. The price of alfalfa advanced from \$16 per ton for loose hay to \$18.50, and for baled hay from \$20 to \$21.

Grand Valley project, Colorado.—Harvesting of the second cutting of alfalfa was in progress. The yield and quality were excellent. Digging of early potatoes began June 10, the price varying from \$1.10 to \$1.75 per hundredweight. Although not up to expectations, the present price will yield a profit. Sugar beets made excellent growth. Harvesting of winter wheat and other cereal crops was completed. The yield in most cases was above average.

Uncompahgre project, Colorado.—The crop outlook continued promising. Harvesting of the second crop of alfalfa and threshing of grain was in progress. Some wheat was moving to market at \$1.85 per hundredweight for hard wheat and \$1.80 for soft. The berry harvest was completed, and in addition to local consumption 25 tons were shipped. Sugar-beet growers were organizing to protest against any reduction in the tariff on sugar.

Boise project, Idaho.—The second cutting of alfalfa was in the stack. Wheat was selling at \$2 to \$2.10 per hundred pounds. The potato yield was about 60 per cent of normal, and the market was not very strong at 90 cents per hundred pounds f. o. b. cars at shipping point. Fruit of all kinds except prunes was in fair condition and reports indicated a good market.

King Hill project, Idaho.—The second cutting of alfalfa was exceptionally good. Early potatoes were not yielding up to

average owing to poor seed. Grain and corn were in good condition. Plans were in good condition. Plans were under way to plant fall lettuce.

Huntley project, Montana.—In general, crops appeared better than ever before. Harvesting was in progress and threshing started.

Milk River project, Montana.—The first cutting of alfalfa was completed and the second cutting was expected to commence shortly. The irrigation of beans, beets, corn, and grain was in full swing.

Sun River project, Montana.—Crops on the Fort Shaw division were in promising condition and reports indicated a heavy first cutting of alfalfa. Grain promised a good yield. Corn was not making rapid growth owing to the cool weather. Where grain crops were irrigated on the Greenfields division the yields will be fairly good.

Lower Yellowstone project, Montana-North Dakota.—All crops were in excellent condition. The first cutting of alfalfa was one of the heaviest ever produced. Corn was somewhat later than usual owing to cold weather. Sugar beets made rapid growth. About 5,500 acres will be harvested and a better tonnage was expected than in the past.

Newlands project, Nevada.—Crops in the Carson division were in excellent condition. Harvesting of the second crop of alfalfa was well under way, indications pointing to the largest yield in the history of the project. Prospects were excellent for a large third crop. Virtually all winter grain had been harvested showing yields above the average. In the Fernley district, where the water shortage has been acute, crops will probably be at least 50 per cent of normal, following the installation of the proposed pumping plant at Lake Tahoe.

Carlsbad project, New Mexico.—Crops generally were in a very thrifty condition. The yield of alfalfa was exceptionally large and prices ranged from \$17 to \$18 per ton, baled, f. o. b. project. The

COMMISSIONER MEAD RETURNS FROM TRIP

Dr. Elwood Mead, Commissioner of the Bureau of Reclamation, returned to Washington, D. C., on August 12, after an extended and strenuous trip over a number of the irrigation projects, where he obtained first-hand information concerning the economic situation and the problems confronting the water users.

cotton crop promised large yields, with indications that the price will be on a level with that of 1923.

Rio Grande project, New Mexico-Texas.—Heavy rains did considerable damage to the second crop of alfalfa. Cotton was doing well, although about 510 acres were destroyed by hail. Pears, cantaloupes, and onions were being shipped in carload lots.

Umatilla project, Oregon.—The second crop of alfalfa was harvested during the month. Good prices were offered, but the inclination of the growers was to hold for higher prices. New potatoes, cantaloupes, and melons were shipped.

Klamath project, Oregon-California.—Alfalfa was doing well, and many farmers expected to start the second cutting early in August. Several will get a third cutting. Prices ranged from \$12 to \$15 per ton in the stack. On Tule Lake leased land a considerable portion of the grain crop will be lost by frost, drought, or grasshoppers.

Belle Fourche project, South Dakota.—The first cutting of alfalfa was completed, and in some cases the second cutting was well under way. Corn made good growth, but was still somewhat backward owing to a late start. Sugar beets were doing well under frequent irrigations. Harvesting of small grains began toward the close of the month.

Strawberry Valley project, Utah.—Crops in general were in fair condition and as a whole were about 70 to 80 per cent of average. The grain crop was harvested with a lighter yield than average. The second cutting of alfalfa was light, owing to heat and hot winds.

Okanogan project, Washington.—The crop estimate remained at about 50 per cent of that of last year, but with the water shortage becoming more acute, it appeared doubtful if more than a portion of this would be saved. Price quotations on apples were better than last year, and water users who can save their crop will make some money.

Yakima project, Washington.—The second cutting of alfalfa was going into the stack at the end of the month. Virtually all grain had been harvested. New potatoes had been dug and were being sold at \$40 to \$75 per ton. Apricots and peaches were being harvested. Apples were giving every indication of excellent crops, with prices at a fairly high level.

Shoshone project, Wyoming.—In general, crops were somewhat backward, but no serious consequences were anticipated unless there should be an unusually early frost which might damage late grains and beans. Rain interfered seriously with the first cutting of hay.

EXAMPLES OF FINANCIAL SUCCESS

James Newnham, Klamath project

NEARLY 20 years ago James Newnham came to the Klamath project. About 1907 he began working for the Bureau of Reclamation as ditch rider, finally becoming water master. At the close of the season of 1919 he ceased working for the United States and began farming an 80-acre tract which he had bought a few months before. About 65 acres were within the Klamath irrigation district and were supplied with water by gravity; about 12 acres were within the Pine Grove irrigation district where water is supplied by pumping. The remaining area was included in rights of way for canals or roads.

Mr. Newnham paid \$6,000 for the place, one-half down, deferred payments to draw interest at 8 per cent. In addition, he had about \$1,000 working capital. There was a small house on the place, as well as a good barn and fair fencing. It is Mr. Newnham's belief that the place he purchased is better than the average and that he paid a little less than the then going price for similar lands. Mr. Newnham has now had the place four seasons. He made his final payment during the fall of 1923; in addition he has spent about \$1,500 for horses, cattle, and equipment, and perhaps added \$1,000 to the value of his place because of his improvements. It figures out that Mr. Newnham must have made his place pay about \$1,500 a year, in addition to his living expenses.

About 65 acres of his land have been in alfalfa. During 1920 he sold his hay at \$17 a ton, the hay to be fed out by him. The following year the hay was sold for about \$7 a ton; in 1922 the price was a little higher. In 1923 he sold his hay at \$10 a ton, fed out.

At different times Mr. Newnham has plowed up portions of his alfalfa and grown potatoes. During 1920 the value of the potatoes sold was about \$1,200; during 1923, \$500. On an average, he has sold fully \$1,000 worth of potatoes each year. On a tract where potatoes have been raised as long as seemed advisable, wheat was raised which in 1923 yielded about 50 bushels to the acre.

Mr. Newnham has a garden which averages around \$400 a year. Turkeys bring him in from \$300 to \$500 a year. chickens about the same as the turkeys; Mr. Newnham milks about 10 cows. It goes without saying that Mr. Newnham is a good farmer who uses his head, works hard, and is ably assisted by his wife. It is their plan not to come to town except

when necessary, and whenever they do come to bring in something to sell.

It is Mr. Newnham's experience that for this country an 80-acre farm is about the right size. One man can handle just about that area by himself, providing he hires help during the haying season. For his style of farming he would not wish a place smaller than 80 acres. Mr. Newnham meets the water charges and taxes as they fall due. He now has his place clear, well stocked with sufficient equipment, and is in a position where he can feel independent and about once a year afford to take a week or two for a vacation.

RIO GRANDE FARMERS SEE GOOD MELON YEAR

During the last week of July and the first week of August fruit distributors on the Rio Grande irrigation project shipped 238 cars of Mesilla Valley melons to eastern markets. This is an increase over last year's record, and the daily shipments were still increasing in quantity. The quality of the melons was good and the market excellent. The fruit was being disposed of rapidly and at high prices. Shippers and growers alike predict a banner year for the melon industry on the project this year.

Crops usually grown for human use, such as potatoes, may be so plentiful and cheap as to warrant feeding the surplus to farm animals instead of placing it in storage.



Two hundred and sixty-seven thousand pounds of hops, valued at \$53,400, were grown on 115 acres on the Sunnyside division, Yakima project, Wash., in 1923—a gross value of \$464 per acre

INTERCROPPING ON THE SALT RIVER PROJECT

TO intercrop or not to intercrop is a question that has been much argued; and no amount of proof will be positive evidence for or against, as it will always be largely a matter of the individual plus always, of course, the influence of soil, moisture, and climatic conditions.

From data at hand from the little farm of L. G. Doby of the Salt River Valley, Arizona, it would seem that growing crops between fruit trees or grape vines may be beneficial rather than injurious. Plums, apricots, and peach trees were planted in March, 1923. This season the plums are bearing. All the trees have made an exceptional growth and indicate that they possess the vigor essential to continued growth. The way this has been handled is believed to be responsible for the growth of the trees. The land has been well cultivated continually and fertilizer in the form of stable manure has been applied both before planting and again last winter. Mr. Doby believes that it is a decided advantage to apply stable manure during the winter. He believes that the best crop for planting between fruit trees is melons, squashes, cucumbers, or other similar vines. This clears the land for the winter application of fertilizer.

Between his grape vines he prefers to plant the small row crops such as beets, carrots, lettuce, etc. Doby carries the plan of intercropping out to the n'th degree, for he intercrops between rows of asparagus. This asparagus was also set in the spring of 1923 and, stimulated by heavy fertilizing and constant cultivation,

FORT LARAMIE CANAL, NORTH PLATTE PROJECT

The Fort Laramie Canal on the North Platte project, Nebraska-Wyoming, is 130 miles long and necessitated the excavation of 11,362,617 cubic yards of material. Of this amount 7,621,570 cubic yards were excavated by contract at a field cost of 17 cents per cubic yard, and 3,741,047 cubic yards were excavated by Government forces at a field cost of 9½ cents per cubic yard. The canal was completed on November 27, 1923.

produced a good fair crop this past season, which is unusual for even the Salt River Valley. This plot of ground received a very heavy top dressing of fertilizer in the winter, and now between the rows are being grown Valencia onions which will come off this fall. No one seeing this orchard, vineyard, or the asparagus plot would for a moment doubt that intercropping is safe and a good economical practice where the soil, already fertile, is made richer by stable manure; where there is plenty of water for irrigation as there is here; where, as in the Salt River Valley, there is a long growing season with a large percentage of sunshine; and last and an equally important factor when the owner is a good farmer and knows the value of intensive cultivation.

The wise feeder soon learns that the proper use of all farm by-products, waste, and surplus crops for livestock feed often constitutes the main difference between profit and loss in feeding.

INSPECTION DIVISION CREATED

ON August 1 the Secretary of the Interior issued the following self-explanatory order:

Effective August 1, 1924, all investigating forces of the several bureaus of the department shall be consolidated into a division under the office of the Secretary to be known as the inspection division, Department of the Interior.

To the inspection division is intrusted the duty of keeping the department advised of the condition and needs of its various activities, the investigation of methods and practices throughout the

department, miscellaneous complaints against supervisors and employees, matters relating to alleged violations of law, and such other work as is now carried on by investigators of the several bureaus.

The officers of the department are requested to cooperate with the chief inspector in making this order effective.

Mr. Joseph F. Gartland has been designated chief inspector and shall have supervision of the personnel of the division and their work. The offices of the division are in rooms 6129 and 6131, Interior Building, telephone branch 73.



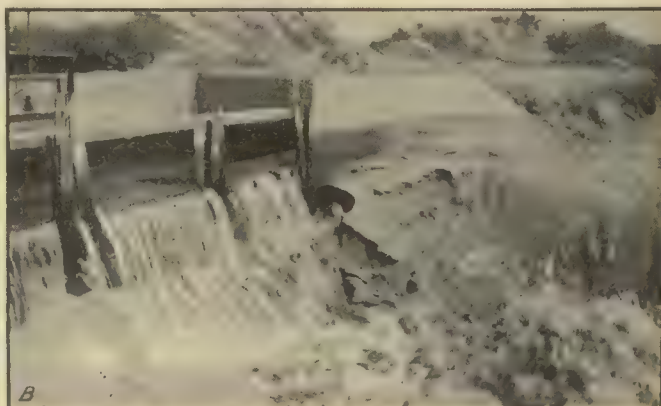
Intercropping on the Salt River project, Arizona

SAND TRAP HELPS TO CLEAR CANAL OF SAND AND SILT

Structure installed on the Notus Canal, Boise project, Idaho, described by R. J. Newell, engineer.—Sediment from drains prevented from blocking canal



A. View of sand trap looking toward outlet while sluicing



B. View of sand trap looking upstream while sluicing

THE water supply for the Notus Canal, which serves the first division of the Black Canyon lands, is obtained from two drains on the Boise project. These drains have been constructed on a grade that causes some scour, and they carry large quantities of sand and silt. This sediment is carried through the feeders and deposited in the canal, which has a light grade, and rapidly fills the channel. The upper end of the canal for three-quarters of a mile was filled twice during the season of 1923 to an average depth of 18 inches. It was cleaned once in the middle of the season, and still the silting caused one bad break and kept the carrying capacity much reduced.

No water could be spared for continuous sluicing at the head of the feeders. The Notus and Caldwell Canals divert from opposite sides of the feeder from the Wilson drain at the same point.

The sand trap here described was constructed in this feeder directly between the intakes of these canals. It consists of a concrete-lined basin about 28 by 40 feet in plan and depressed 8 feet below the canal grade. The inlet and sides are warped and sloped toward the outlet which leads from the bottom grade of the basin back into the drain.

The outlet is a 6 by 6 foot reinforced concrete culvert, passing under a highway, and is controlled by a radial gate 6 feet by 11 feet 4 inches. A skimming weir, adjustable by means of stop planks, is placed in front of each head-gate structure. By this means the canals draw from the clearest water at the surface and the storage capacity for sediment is increased.

Cost of sand trap

Estimates (designs).....	\$435.46
Excavation, 560 cubic yards, at \$0.904.....	506.85
Concrete, reinforced, 122 cubic yards, at \$19.87.....	2,423.25
Structural steel, 920 pounds, at \$0.181.....	126.00
Gates and lifting devices.....	767.96
Paving, dry, 15 cubic yards, at \$3.88.....	58.20
Backfill, dry, 190 cubic yards, at \$0.236.....	44.82
Engineering and inspection.....	734.05
Superintendence and account.....	181.96
General expense.....	340.22
Total.....	5,618.77

MINERAL LEASING LAW HELPS RECLAMATION

Receipts of the Federal Government from bonuses, royalties, and rentals under the law providing for the leasing of mineral rights on the public domain aggregated \$13,627,588 for the fiscal year ended June 30, 1924.

The largest receipts were obtained from leasing mineral lands in Wyoming, the amount being \$12,270,322. The second State in the list of receipts was California, with \$957,480. Receipts from other States follow: Montana, \$221,426; Alabama, \$85,460; Utah, \$35,402; Colorado, \$33,513; North Dakota, \$10,587; Washington, \$6,280; New Mexico, \$4,784; Louisiana, \$2,295; South Dakota, \$34.

According to the mineral leasing law, each State government receives 37½ per cent of the receipts from bonuses, royalties, and rentals accruing from public lands within its borders, the reclamation fund receives 52½ per cent, and the other 10 per cent is placed in the Federal Treasury. In case of back royalties, however, the division among the States, the reclamation fund, and the Federal Treasury is in the ratio of 20, 70, and 10 per cent, respectively.

The sediment deposited in the basin since completion takes an endwise slope of about 5 to 1, and starts drifting over the upstream end of the skimming weirs, now set at 2 feet above the canal grade, when the basin is about two-thirds full. The capacity of the basin below canal grade is about 200 cubic yards. In operation the lower end does not fill completely, while the silt in the upper end piles up to the top of the weirs and fills in the bottom of the feeder for some distance upstream, making the actual amount of sediment stored at least 250 cubic yards. From 15 to 20 minutes' time is required to raise the outlet gate, scour the collected sediment out of the basin and the lower five or six hundred feet of the feeder channel, and shut the gate again. When the gate is opened the first rush carries out a large quantity of sediment, which is dropped first at the lower end and then in the outlet culvert, obstructing the flow to such an extent that the water is backed up in the gate well at the head of the outlet culvert. A few minutes' time is required to scour the outlet clear again, and thereafter the flow in the culvert is not over 2 feet deep.

The discharge of the feeder is about 85 second-feet, making the quantity of water wasted at each operation about 2½ acre-feet.

Experience to date would indicate that the basin will fill about once in two weeks.

At this rate the water used in sluicing would equal about 4 miners' inches continuous flow.

Feeders who can not understand the poor condition of their animals when given good feeds should examine them carefully for ailments and remove the cause.

LAND AND WATER LAW

A WATER USERS' ASSOCIATION in Idaho must own or control an irrigation system in order to claim the benefit of the proviso at the end of section 4713, Idaho Compiled Statutes, relating to the quorum required at stockholders' meetings. (*Knoor v. Reineke* (Idaho), 224 Pac. 84.)

Under sections 7417-7504, Remington's Compiled Statutes of the State of Washington, irrigation districts are not public or quasi-municipal corporations which would make it legally impossible for one district to include territory of another. (In re Riverside Irrigation District (Wash.), 225 Pac. 636.)

In Kansas, a water course which is partly artificial—that is, partly made by the action of flowing water and partly by the hand of man—does not necessarily deprive the stream of the attributes of a water course nor prevent the application of the rules thereto which apply to other water courses. (*Horner et al. v. City of Baxter Springs* (Kans.), 226 Pac. 779.)

Government land acquired under the stock raising homestead law of December 29, 1916 (39 Stat. 862), by an entryman who is unmarried at the time of making the entry, is the separate property of the entryman, notwithstanding he is a married man at the time of making final proof. Such land, so acquired, is exempt from attachment or execution for a debt contracted by the entryman prior to issuance of patent from the Government. (*Citizens' National Bank of Albuquerque v. Ruley* (Ariz.), 226 Pac. 416.)

The Bureau of Reclamation (Reclamation Service) is a field service under the control of the Secretary of the Interior, with its headquarters located in Washington, D. C., and the accounts thereof are required by section 22 of the act of July 31, 1894 (28 Stat. 210), as extended by section 304 of the act of June 10, 1921 (42 Stat. 24), to be administratively examined at the seat of government. (3 Comp. Gen. 931.)

Riparian rights in the State of Washington date from the first step taken to secure a title from the Government. Such rights can not be defeated by subsequent appropriation. An appropriation of

waters consists of an intention to appropriate followed by reasonable diligence in applying the water to a beneficial use. A bona fide appropriation of water for a beneficial purpose is superior to subsequently acquired riparian rights. (In re water rights in Alpowa Creek (Wash.), 224 Pac. 29.)

Where an appropriator of water in Idaho has diverted and conveyed to his lands by means of a dam in the natural stream and a substantial ditch leading therefrom, water in excess of the amount required to irrigate his cultivated land and used the excess for irrigating the remainder of his lands, which consists of pasture and wild hay land, and thereby increased the productiveness of such uncultivated land, it constitutes a beneficial use of the excess water diverted. (*Rudge v. Simmons et al.* (Idaho), 226 Pac. 170.)

A canal, constructed by the Government, near Stockton, Calif., to improve navigation, overflowed, intermittently flooding the land of one Sanguinetti, but not ousting him from his customary user, except for brief periods, or inflicting permanent injury. It did not appear either that the flooding was intended or anticipated by the Government or its officers, or that it was attributable directly, in whole or in part, to the improvement, rather than to natural conditions. The United States Supreme Court held that no taking could be implied, and the United States was not liable *ex contractu*. (*Sanguinetti v. United States*, 264 U. S. 146.)

In Idaho the owner of a water right, by purchase or original appropriation, may sell the water right separate and apart from his land. Where the acreage of a Carey Act project is reduced on account of an insufficient water supply, the settlers owning water rights within the area excluded from the project are not deprived of such water rights by the reduction of acreage, but have a vested right therein, which may be sold by the owners and transferred to lands within the retained area of the project. (*Glavin v. Salmon River Canal Co.* (Idaho), 226 Pac. 739.)

If, by virtue of stock in a ditch corporation in Idaho one has merely the right to compel the corporation to deliver him so much water at a given place, he has no

right to compel the corporation to deliver the water through a particular ditch, but it suffices if the water is delivered to him in sufficient amount and without injury, inconvenience, or additional expense. However, if such person has an interest in a particular ditch and the right to have his water carried through it, he has a right to compel the corporation to carry it through that ditch. (*Dukes v. Canyon Hill Ditch Co.* (Idaho), 224 Pac. 85.)

Under the law of Texas, riparian rights arise out of the ownership of land through or by which a stream of water flows and can not extend beyond the original survey as granted by the State. Parcels of land should be regarded as riparian so far as their location with reference to the stream has indicated where their boundary should be fixed, so that all that parcel which is regarded as one tract should be regarded as riparian, leaving the question of the extent of the use which may be made of the water to the rules regulating the relative rights of owners on the stream. Under this rule the boundary of riparian land is restricted to land the title to which is acquired in one transaction. (*Sun. Co. v. Gibson* (Tex.), 295 Fed. 118.)

A canal company, owning a right of way for an irrigating canal, is held only to the usual and ordinary course and manner of construction of its irrigating systems and is not an insurer. It is not liable for breaks occurring in its system occasioned by unprecedented and extraordinary floods which in the usual and ordinary course of events are not to be anticipated. Its legal obligations are to anticipate such heavy rainfalls as are usual or do frequently occur in the vicinity or section of the State where its canal system is located. Such a canal company is liable for all damages occasioned by the negligent operation of its irrigating system, irrespective of whether a right of way has or has not been granted for the construction of its canals or irrigating ditches through the premises involved. In other words, the granting of a right of way releases the canal company from such damages as are usually and ordinarily attendant upon the building and operation of canals and irrigating ditches. (*Hunt v. Sutter-Butte Canal Co.* (Calif.), 225 Pac. 884.)

Animals even of the finest breeding, although given the best feeds in correct proportions, will not make a profit for the feeder if they are not properly cared for and kept in good health.

ADMINISTRATIVE ORGANIZATION FOR THE BUREAU OF RECLAMATION

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John H. Edwards, Solicitor for the Interior Department; E. K. Burlew, Administrative Assistant to the Secretary; J. H. McNeely, Assistant to the Secretary;

John Harvey, Chief Clerk

Washington, D. C.

Elwood Mead, Commissioner, Bureau of Reclamation

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J. B. Beadle, Chief Clerk

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Harry Caden, Fiscal Agent

D. W. Davis, Director of Finance

H. L. Holgate, Chief Field Counsel

R. M. Patrick, Armand Offutt, and F. J. Bergin, District Counsel

W. F. Kubach, Auditor

W. A. Meyer, Fiscal Inspector

Project	Office	Superintendent	Chief clerk	Fiscal agent	District counsel	
					Name	Office
Belle Fourche	Newell, S. Dak.	F. C. Youngblutt	R. C. Walber		Brooks Fullerton	Mitchell, Nebr.
Boise	Boise, Idaho	J. B. Bond	E. R. Mills	C. F. Weinkauff	B. E. Stoutemyer	Boise, Idaho.
Carlsbad	Carlsbad, N. Mex.	L. E. Foster	V. L. Minter	V. L. Minter		
Grand Valley	Grand Junction, Colo.	S. O. Harper	W. J. Chiesman	C. E. Brodie	J. R. Alexander	Montrose, Colo.
Huntley	Ballantine, Mont.	A. R. McGinness	J. P. Siebeneicher	Miss M. C. Simek	E. E. Roddis	Helena, Mont.
King Hill	King Hill, Idaho	G. H. Harris	E. V. Hillius	E. V. Hillius	B. E. Stoutemyer	Boise, Idaho.
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Newlands	Fallon, Nev.	J. F. Richardson	G. B. Snow	Miss E. M. Simmonds	P. W. Dent	Berkeley, Calif.
North Platte	Mitchell, Nebr.	Andrew Weiss	L. H. Mong	V. E. Hubbell	Brooks Fullerton	Mitchell, Nebr.
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Orland	Orland, Calif.	R. C. E. Weber	C. H. Lillingston	C. H. Lillingston	P. W. Dent	Berkeley, Calif.
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Shoshone	Powell, Wyo.	L. H. Mitchell	W. F. Sha	Mrs. O. C. Knights	E. E. Roddis	Helena, Mont.
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Umatilla	Hermiston, Oreg.	H. M. Schilling	G. C. Patterson	Miss M. G. Valentine		
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Williston	Williston, N. Dak.	W. S. Arthur	W. S. Arthur	H. C. Melaas	E. E. Roddis	Helena, Mont.
Yakima	Yakima, Wash.	J. L. Lytel	R. K. Cunningham	J. C. Gawler		
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Large Construction Works

Minidoka, American Falls	American Falls, Idaho	F. A. Banks ³	H. N. Bickel	O. L. Adamson	B. E. Stoutemyer	Boise, Idaho.
Umatilla, McKay Dam	McKay Dam, Oreg.	R. M. Conner ⁴	C. B. Funk	W. S. Gillogly		
Yakima, Tieton Dam	Rimrock, Wash.	Walter Ward ¹	V. G. Evans	C. F. Williams		

¹ Project operated by Salt River Valley Water Users' Association.

² General Superintendent and Chief Engineer.
³ Construction Engineer

⁴ Superintendent of Construction.

The NEW RECLAMATION ERA is issued every month by the Bureau of Reclamation of the Department of the Interior, Washington, D. C. It is printed by the Government Printing Office, Washington, D. C.

The NEW RECLAMATION ERA is sent regularly to all water users on the reclamation projects under the jurisdiction of the bureau who wish to receive the magazine. To other than water users the subscription price is 75 cents per year, payable in advance. Subscriptions should be sent to the Chief Clerk, Bureau of Reclamation, Washington, D. C., and remittance in the form of postal money order or New York draft should be made payable to the Chief Disbursing Clerk, Department of the Interior. Postage stamps are not acceptable in payment of subscription.

THE INTERIOR DEPARTMENT will spend \$38,425,336 less during the fiscal year ending June 30, 1925, than it did during the fiscal year ending June 30, 1924, according to a tabulation of appropriations just completed at the Interior Department.

This reduction, one of the largest ever made in the history of the department, represents a net saving, the total appropriations for all the bureaus of the department in 1925 being \$290,493,724 as compared with \$327,591,440 in 1924.

The biggest decrease in a single bureau of the department was in the Pension Office, where the appropriation for pensions was reduced by \$30,500,000. Another reduction of considerable size was for Alaskan Territorial Government and the Alaska Railroad, the saving amounting to \$1,969,630.

Appropriations for the Bureau of Reclamation were also reduced from \$12,250,612 in 1924 to \$10,856,000 in 1925, a reduction of \$1,394,612, while appropriations for the Bureau of Indian Affairs were cut down by \$468,484. St. Elizabeths Hospital, located in Washington, also had decreased appropriations to the amount of \$138,500.

There were increases in the appropriations of a number of bureaus of the Interior Department, the largest being \$413,315 for the Patent Office.

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NEW RECLAMATION ERA

VOL. 15

OCTOBER, 1924

NO. 10

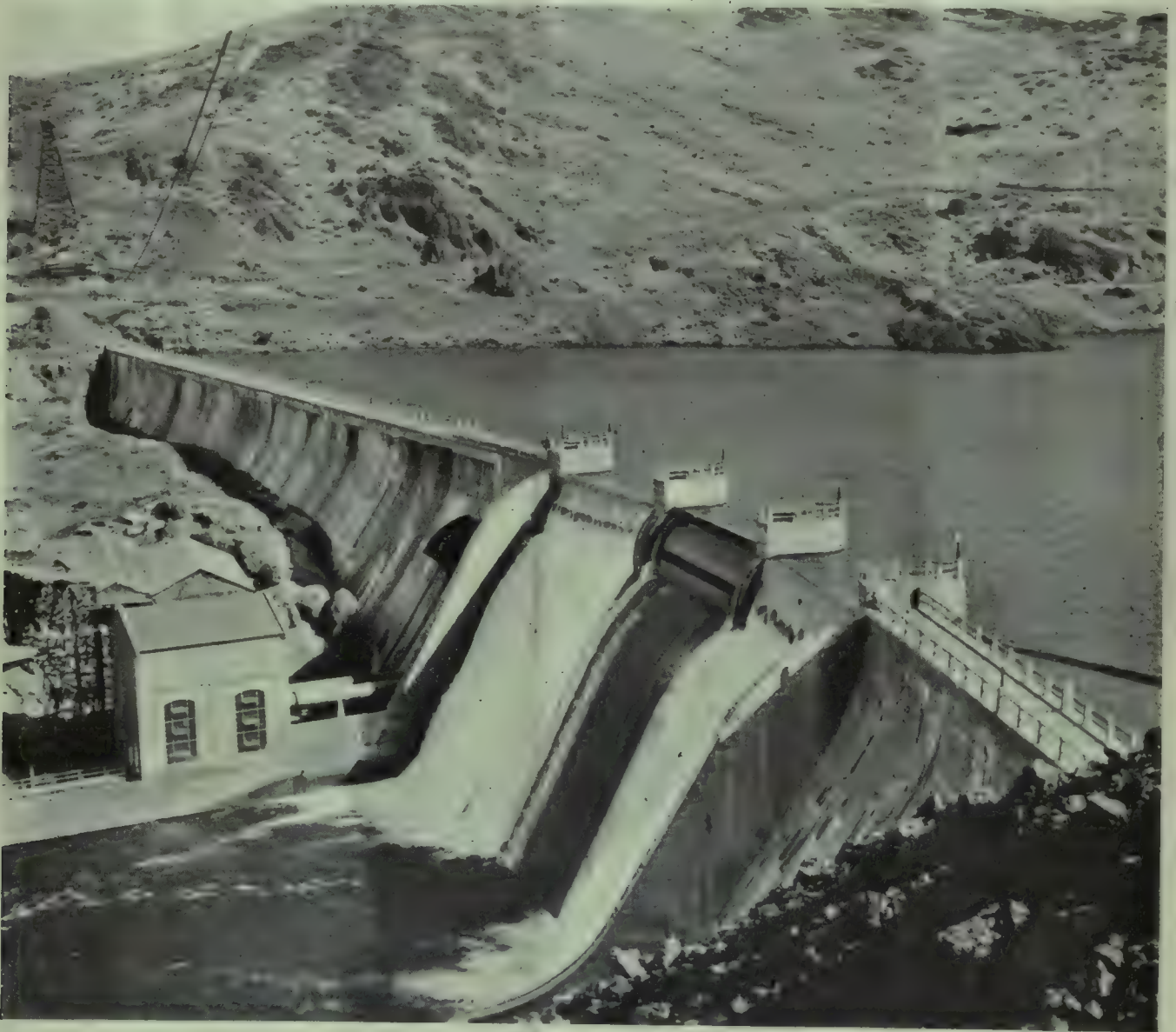


Photo by A. F. de Lima Campos, engineer, Rio de Janeiro, Brazil

BLACK CANYON DAM AND POWER HOUSE, BOISE IRRIGATION PROJECT, IDAHO

Height, 183 feet; crest length, 1,040 feet; volume, 79,800 cubic yards. The dam was completed in April, 1924

The Secretary of the Interior

WASHINGTON

August 28, 1924.

*Memorandum for all Field Offices,
Bureau of Reclamation.*

THIS season has in many ways offered more obstacles to the successful administration of reclamation projects than any since the Reclamation Act was passed. To the financial distress of settlers and the critical attitude which this has engendered there has been added the difficulties and losses which have come from drought, hail, and insect pests. All of these have combined to make the position of those charged with the administration of these works and the delivery of water unusually arduous and difficult.

The Commissioner has just completed a tour of a majority of the districts and has reported the faithful, patient, and courteous manner in which the field personnel of the Reclamation Service has performed its duty. As the season approaches its close it is with satisfaction that the Secretary joins with the Commissioner in bearing testimony to the high character of this Service.

*HUBERT WORK,
Secretary of the Interior.*

*ELWOOD MEAD,
Commissioner of Reclamation.*

NEW RECLAMATION ERA

Issued monthly by the Bureau of Reclamation, Department of the Interior, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 15

OCTOBER, 1924

No. 10

COMMISSIONER MEAD URGES PLANNED COLONIZATION

In special report to the Secretary of the Interior, based on comprehensive study of reclamation conditions, a carefully planned policy for colonization of future projects is urged

DR. ELWOOD MEAD, Commissioner of the Bureau of Reclamation, left Washington on June 8; visited irrigation projects in Utah, Nevada, California, Washington, Oregon, Montana, Idaho, Wyoming, and Nebraska; and inspected 13 old projects and 6 proposed new projects. During the course of his journey, which lasted two months, he traveled over 9,000 miles, 2,500 of which were by motor. His report to Secretary Work in part follows:

"On each proposed new project an economic survey has been organized under the direction of G. C. Kreutzer, Director of the Division of Farm Economics. In this survey, the cooperation of the State Agricultural Colleges of Utah, Nevada, California, Oregon, Washington, and Idaho has been secured and these institutions have generously extended the services of experts on soils and farm management. These experts are now engaged in working out the problem of what water for irrigation is worth in the districts of their States where the proposed projects are located and what it will cost settlers to change raw land into improved farms. Soil experts from the Department of Agriculture are also giving valuable assistance in these studies. When these experts have reached their conclusions on all of the proposed new projects, they are to be submitted to local committees of bankers, farmers, and business men for their suggestions as to costs and methods of development.

"The acreage cost of irrigation works will be greater in the future than they have been in the past. They are now greater than they were ten years ago. Locations where canals can be built at small cost have been utilized. Hereafter they must follow more difficult routes, and the cost of storage must be included in all important schemes. This means less margin between outlay and income and greater need to guard against mistakes and waste. Every factor that would lessen expense and hasten development of income must be considered.

"For the last six months I have been studying the causes for increasing arrears of payments by settlers and the widespread demand for postponement of payments on Federal irrigation projects. One reason has been the extreme agricultural depression, which, however, is temporary and may be ignored. There are others more serious which we must consider. One of these is the terms on which settlers have bought farms and the prices they have paid for them. Another is the lack of capital and lack of other qualifications indispensable to success in agriculture. The evidence is conclusive that we must in the future pay more attention to settlement problems and the qualifications of settlers if we are to escape complications and losses that will discredit, if not terminate, this policy. We can not go on ignoring the things which determine ability to make payments, while expending from \$5,000 to \$12,000 on 80-acre farms to provide water."—Elwood Mead.

"While water charges must in the end come from irrigated crops, irrigation works that are not followed promptly by irrigated agriculture are a financial burden to landowners. Long delayed agricultural development has wrecked more of these enterprises than all other causes combined. The costlier the work the more important it is that this fact be recognized. Neglect to include plans and methods for bringing land promptly under irrigation culture is to neglect a fundamental condition of success. Hereafter more attention must be given as to where and how money needed in agricultural development is to be obtained; where and how settlers are to be secured; and how the settlers must be aided and directed to enable them to use their money, effort, and time to the best advantage. The acre cost of water rights under past public notices has varied from \$14 to \$118 with only three over

\$100. New projects under consideration vary from \$97 to \$157. This is for the canals and reservoirs only. In order to use the water and to create homes, land must be leveled and houses, barns, and fences built. These with farm equipment will add close to \$100 per acre to the cost of the farm.

"In order that the farmers may succeed, a practical business superintendent who has a knowledge of farm conditions should be employed to plan settlement and advise settlers. His work should begin before settlement in ascertaining where the things needed in farm development can be acquired. This would include horses, cows, and other livestock. He could secure plans and estimates for houses and barns so that when settlers arrive they can be saved time and labor and be helped to use their money to the best advantage. The land should be sold to settlers on terms that would make it a commercial undertaking. The interest recommended is 5 per cent and the yearly payments on principal 1 per cent. With such yearly payments the settler could pay for his farm in 34½ years and with these small payments he would be relieved from the danger of mortgage foreclosures and would be each year adding to his equity in the property.

"Farms should be valued according to location, quality of soil, and ease or difficulty of irrigation. A map should be prepared which would show location of farms, valuation of each, and such information as would enable intending settlers who have not seen the area to know the reason for these prices.

"There should be a capital requirement which would vary with the size of the farm. It should be a percentage of the cost of the farm and its development, and for a 40-acre farm should be not less than \$1,500. Farm laborers could be accepted without any capital, provided they could make the initial payment on the land and furnish 40 per cent of the cost of their dwellings and other necessary improvements.

THE FIRST NEED OF A SETTLER IS A HOUSE

Advances to settlers for permanent improvements have passed the experimental stage in other countries, where their economic and social value has been recognized

"The first need of a settler is a house. It is a permanent improvement, and if he can be aided in its construction by advancing 60 per cent of the cost, requiring the settler to pay in cash 40 per cent, it will leave money to be spent on things like livestock and farm implements. The advantage of this kind of advances has been tested out in so many countries that there is nothing experimental about it. It is far safer than the investment in canals, and it has greater social and economic value. Under the State land settlement law of California the board can advance for the improvement and equipment of a farm up to \$3,000. This has proven the best part of the whole scheme and is the one which has enabled settlers to stay on the land and meet their payments to the State.

"Money advanced for farm improvements should pay 5 per cent interest, and the period of repayment should vary from 3 to 20 years. A 20-year loan on permanent improvements like a house is safe, and yearly payments of 3 per cent on the principal, making a total of 8 per cent, will pay off the debt in 20 years.

"There is little prospect that any irrigation works built hereafter by the Government will cost less than \$100 an acre, and one now authorized may cost \$200 an acre. To pay these large prices for water means that farms must be improved and equipped for growing crops and handling livestock in a way to secure the largest results. That alone costs more

money than many settlers possess even when land is free. To put settlers without capital, and often without experience, on irrigated farms does not give them an opportunity; it simply involves the Bureau of Reclamation in trouble and the Government in loss.

"I have just inspected an area on a Federal irrigation project where the settlers for 80 farms of unentered public lands were chosen by a lottery. It is evident that the majority of these settlers had no conception of the responsibility they were assuming. They thought the Government was giving them something. On many of these farms they erected the same kind of a shack the nominal homesteader used to erect. This was a 10 by 12 tar-paper structure without a floor. Without money and experience they could go no further. Many of them did not know how to try and what they did was to look for some one who would rent their holding. They found what they sought in a group of Russians who are the tenants on nearly all of the 65 farms now rented. Instead of an American soldier settlement we have created an alien colony. The reclamation fund is not being reimbursed. All the desirable social and economic purposes of the law are being lost and the bureau has a problem that never would have been created under a properly thought out plan of settlement.

"Much of the land to be reclaimed hereafter is privately owned, or will be when the works are authorized. The price at

which its owners sell the land to settlers and the terms on which it is sold are likely to be as important factors in development as the cost of the water right. Inflation of land prices, high interest rates, and too short a time for payment for the land to enable the money to be earned out of the soil are among the main reasons why settlers are not paying the Government. We must in the future consider land prices and the mortgage debts on privately-owned lands.

"Here is an example: We are next spring to announce project costs on an area that was settled and has been cultivated by dry-farming methods. The people living on this land urged the Government to build the canal and agreed to pay the cost, but now that the time has come to assume this obligation they state that the cost is more than they can afford to pay. They say that no payments should be required for the first five years because the settlers are so heavily in debt that they must first pay off their mortgages and get rid of high interest rates before they can consider paying the Government, and they will use every effort possible to have the Government forego payments in order that their financial corpse may be resurrected.

"I am not now presenting a solution for the old projects. What I have seen in the last 15 years of the achievements of planned settlement and financed farm development in other countries compels me to realize that we are ignoring the most valuable features of reclamation, and a few demonstrations like the colonization plan I propose will assure the success of reclamation in the future."

"I wish to say that the New RECLAMATION ERA is conducted along the right lines."—T. W. Monell, Montrose, Colo.

Settlers can be greatly assisted, and the money provided for development made to go much farther if they are helped to cooperate in the improvement and equipment of their farms. A cooperative stock buying association will get better cows and horses than will be secured if each settler is left to shift for himself. Cooperation in the purchase of implements often enables settlers to get wholesale prices.



COMMISSIONER MEAD AND PARTY AT ARROWROCK DAM, BOISE PROJECT, IDAHO

Left to right: Hon. Charles C. Moore, Governor of Idaho; Captain Jeter, Secretary of State; D. W. Davis, Director of Finance; Judge Lee; Miss Mae A. Schnurr, Secretary to the Commissioner; Commissioner Elwood Mead; F. E. Weymouth, Chief Engineer; George C. Kreutzer Director of Farm Economics

ECONOMIC AND AGRICULTURAL DEVELOPMENT OF PROJECTS

Questionnaire sent by George C. Kreutzer, Director of Farm Economics, to superintendents of all projects, to determine what is necessary to establish sound and profitable agriculture

GEORGE C. KREUTZER, Director of Farm Economics of the Bureau of Reclamation, under date of August 21, 1924, sent the following self-explanatory circular letter to each project superintendent:

Information is immediately required as to the agricultural and economic conditions of each of the United States reclamation projects to determine what is necessary to establish on each project a sound and profitable agriculture in order that they may be turned over to the water users and thus terminate governmental expenditure.

What is needed to colonize the unsettled land?

Is part of the project unsuited for irrigated agriculture?

Is the kind of agriculture followed well balanced?

What industries are needed?

Is the credit situation such that both long and short time credit can be obtained readily and with reasonable rates of interest, or is the credit situation a serious handicap to development?

On June 20, the Secretary of the Interior ordered that 17 of the projects be investigated to determine these and other facts. Funds and time have not permitted the work to proceed rapidly or completely.

The commissioner now requests that a brief statement setting forth the needs of each project be included in the annual report. The time for preparing this information is therefore short, and it is realized that to collect the data asked for in this report would consume a considerable period of time, which is not available. Therefore, those preparing the report should give their impressions based on their local knowledge of the situation and in that way the report will reach this office in the time specified. Reports dealing with the items listed hereunder should be mailed to this office in duplicate not later than September 1, 1924.

General nature of report.—The report should cover the subjects named herein and such related matters as may be of assistance in solving the economic and agricultural problems of the project.

Classification of land.—Are soils of uniform character or is a careful soil survey needed?

What acreage needs drainage?

What acreage now included in the project is possibly unsuited to irrigated farming? If eliminated what will be the effect on the operation and maintenance charges and further, is there better land adjacent

to the project that may be included, capable of returning all charges?

Reclamation and other charges.—Give brief statement of total annual fixed charges per acre on some of the typical units of the project. This should show operation and maintenance charges; annual original construction charges; supplemental construction charges; drainage charges where not included in original or supplemental construction charges; improvement district, State and county taxes, and other fixed charges. In other words, how much must a settler make annually per acre to pay fixed charges and live?

What is the bonded indebtedness per acre for drainage, betterments, and improvement districts? Give interest rate and plan of repayment.

Crops and income.—What crops and income are derived therefrom on a typical farm unit in full production?

What crops and acreage of each, on a typical farm, could be recommended as sound agriculture?

Are farmers losing money by growing bulky, cheap crops which are sent to distant markets?

What are the freight rates to principal markets for the chief commodities?

Has sale of products been affected by quarantines or have low yields been obtained by plant diseases that organization could prevent?

Are dairy cattle and other livestock kept in sufficient numbers?

Are livestock generally well bred and healthy?

What industries are needed in the communities (cheese factories, canneries, etc.)?

To what extent do cooperative marketing organizations function and what others in your opinion are needed?

Colonization and land settlement.—Is land being held in excess of established farm units?

To what extent are large land holders generally delinquent?

How many acres or farms require settlers?

How many farms are abandoned and generally what opportunity do they offer for settlers? Why were they abandoned?

What prices are being asked for both improved and unimproved land? Are the prices too high?

Give general terms of purchase. If much land is unoccupied is it not a fact it will have to be settled under a definite plan in which the prices are based on the productivity of the soil and settlers selected on their merits as to capital, in-

dustry, and experience? Has the community done anything to accomplish this?

Financial condition of settlers.—Are settlers generally in arrears in their payments for operation and maintenance and construction charges?

Have they defaulted in taxes and other fixed charges?

To what extent are they mortgaged and are mortgages generally overdue?

What prospect of renewing; give rates of interest and state if commissions are charged.

Credit.—Does the Federal land bank make loans on farms? To what extent? If not, why?

Do life insurance companies loan money on project lands?

What are the prevailing terms of long-time credit, rate of interest, etc.?

Do banks accommodate settlers for short-time money? Give rate of interest, length of loan, and renewal.

Have banks failed in the community and what reorganization has taken place?

Guidance and advice to settlers.—What guidance and advice do settlers now receive in solving their problems?

Speculation and unplanned land settlement.—To what extent, in your opinion, have land speculations and unplanned land settlement brought about existing conditions?

Growth of communities.—Has the general depression depopulated the project?

Is the morale of the settlers on the project good or otherwise?

Transfer of project to water users.—Certain construction works may be necessary and legal questions settled before the project can be transferred to the water users, and if settled are there any economic or agricultural matters which would be obstacles to such transfers?

Form of report.—As stated in paragraph 3, the time for submitting this report is short, and it is not expected that it be elaborately done. Send two copies. Your opinions will be valuable in assisting to determine what is necessary to establish a sound and profitable agriculture on the project and to forecast what public expenditure of money and talent is necessary to put the project on a sound, growing basis.

Every new settler who succeeds adds to the earning power of a project. Every settler who fails adds something to its cost.

COST OF FARM DEVELOPMENT ON AN IRRIGATION PROJECT

Report of British oversea settlement delegation to Australia contains carefully prepared estimates of the cost of bringing an irrigated farm unit to the producing stage

THE recent report of the oversea settlement committee from the delegation appointed to inquire into conditions affecting British settlers in Australia contains a wealth of information comparable only to that found in the recent report of the committee of special advisers on reclamation to the Secretary of the Interior. The keynote of each report is the necessity for a clearer outlook on the economic side.

Interesting data gathered by the oversea settlement committee relate to the cost of developing farms of different sizes and devoted to different purposes in an irrigated region. Some of these statistics are given below for the purpose of comparison with similar costs on the irrigation projects of the Bureau of Reclamation.

The following is an estimate of the cost of developing a 40-acre farm for alfalfa for sheep grazing in the Murrumbidgee irrigation area:

Clearing 40 acres.....	\$1,200
Grading and ditching.....	1,000
Fencing (material only).....	750
Seeding 20 acres to alfalfa.....	175
Seeds and manure.....	75
House (maximum).....	1,750
Sheds.....	400
Implements.....	1,000
Horses and harness (2 horses).....	375
Furniture.....	250
Living expenses, horse feed, and sundries.....	750
Cow.....	50
Pigs.....	50
Poultry.....	25
Contingencies.....	150
Total.....	8,000

Another estimate in the report covers the cost of the development of a 40-acre

farm for dairying in the Murrumbidgee irrigation area. Here the costs run up to \$10,000, as shown in the following table:

Clearing 40 acres.....	\$1,200
Grading 25 acres, at \$25.....	625
Grading 15 acres, at \$20.....	300
Fencing (material only).....	500
Seeding 20 acres to alfalfa.....	175
Seeds and manure.....	75
House (maximum).....	1,750
Sheds, dairy, etc.....	1,000
Yard and pig sties.....	375
Implements.....	1,000
Horses and harness (2 horses).....	375
Cows and bull.....	1,000
Furniture.....	250
Living expenses, horse feed, and sundries.....	750
Pigs.....	150
Poultry.....	25
Contingencies.....	75
Additional labor.....	275
Total.....	10,000

It will be noted that the cost of the land, interest, and water charges are not included. The settler would receive very little from his holding during the first year, as his time would be largely occupied with fencing and grading and getting his holding into shape.

J. A. Aird, economist of the State rivers and water supply commission, gives the following estimates of the cost of developing a 60-acre irrigated farm in Victoria, Australia, devoted to dairying, alfalfa growing, and mixed farming:

House and outbuildings.....	\$1,400-2,000
Fencing.....	500-600
Grading and channelling.....	1,400-1,600
Alfalfa seed and other seed.....	250-300
Cultivation (living one year).....	500-600
Total.....	4,050-5,100

Stock and plant.—Three horses, 10 cows, 1 bull, poultry, plough cultivator, mower and rake, various harness, wagon, separator, utensils, and tools will cost from

\$1,500 to \$2,000. If interest and water charges are added, the capital required would be \$6,850 to \$8,200; and if the value of the land is taken into account—from \$65 to \$100 per acre—the total capital would be from \$10,850 to \$13,700.

It is interesting to compare the foregoing statistics with similar data taken from Dr. Elwood Mead's report on the Murrumbidgee irrigation area showing the minimum first year expenses of settlers buying a 40-acre farm costing \$10,940 in one of the State land settlements of Durham or Delhi, Calif. The estimated cost of developing such a farm is as follows:

Semiannual land payment.....	\$310
House.....	1,640
Farm buildings.....	655
Team.....	330
Cows, pigs, and chickens.....	1,095
Farm implements.....	820
Furniture.....	330
Leveling and alfalfa (15 acres).....	875
Planting and cultivation (20 acres).....	440
Ditches, laterals.....	440
Living expenses.....	550
Total.....	7,485

As pointed out by Dr. Mead the total is below rather than above the average outlay, as it does not include taxes, water charges, or doctors' bills.

"According to figures collected and published by Mr. Wright, farm management specialist of the agricultural division of the Californian State College of Agriculture, the average cost of equipping 20 farms of an average size of 51 acres at the Durham settlement in 1921 was for fixed capital \$18,292, working capital \$3,991, total \$22,283."



Threshing 53 bushels of wheat per acre on one of the irrigation projects of the bureau

CANADIAN POINTERS FOR RECLAMATION PROJECTS

Experience has shown that in the majority of cases the settler can not succeed without the establishment of some credit scheme which will enable him to borrow money on long-time payments

(This is the third of a series of articles dealing with the aid which Canada gives her settlers in establishing homes on the land. The second article was published in the September issue of the NEW RECLAMATION ERA.)

SASKATCHEWAN

THE Saskatchewan farm loans act of 1917 authorizes the Saskatchewan farm loan board to make long-term loans to agriculturists of the province for the following purposes:

- (a) To construct permanent improvements upon the land;
- (b) To develop land with a view to the increased production thereof;
- (c) To discharge liabilities previously incurred for such purposes;
- (d) To acquire land for agricultural purposes in cases which meet with the special approval of the board, and upon such conditions as the board may deem advisable.

In every case loans are made upon mortgage security of the property in question.

The terms of a loan under the farm loans act are briefly as follows:

- (a) No loan shall be made for an amount greater than 50 per cent of the board's valuation of the property. Generally, however, the board does not care to loan more than 40 per cent of its own valuation, or to "blanket" a prior mortgage on the property for more than 12 months.
- (b) The loan is made for 30 years, at an interest rate of $6\frac{1}{2}$ per cent per annum. Principal and interest are repayable on the amortization plan, in thirty equal annual instalments. Thus, the annual payment on a loan of \$1,000 would be \$76.58.
- (c) Subject to regulations drawn up by the board, and the approval of the lieutenant governor in council, the borrower is allowed the privilege of paying off the whole or any portion of the principal on any installment date.

Procedure covering the application for a loan.—Any person purposing to obtain a loan under the act must obtain from the commissioner, Saskatchewan farm loan board, Regina, an application form, which he will fill in for the minimum amount that will answer the purpose for which it is being borrowed. He must state the use to be made of the money. If the loan is for projected improvements, such should be mentioned in detail, with the size, construction, and value of each building to be erected on the property

offered as security. If there is an existing mortgage to be paid upon the property, the date of its maturity must be given.

Realizing the increasing necessity for mixed farming, and recognizing the endeavor of a large proportion of the agricultural population to obtain good stock, the provincial government has made provision whereby a bona fide farmer may purchase cattle, sheep, and swine at their actual cost to the Government. All animals purchased are carefully selected by trained men, and the best procurable for the money expended are obtained. The department exercises care in shipment, but will not in any way be responsible for animals after they are laid down at the purchaser's nearest railway station. Owners or their agents will, if notified, be required to take charge of the animals upon arrival at their destination, will be expected to assist in unloading, etc., and will assume all responsibility then and thereafter.

Qualifications necessary to obtain credit. In order to receive stock under the provisions of any credit option, an applicant must be actively engaged in farming and a member of a local agricultural organization, which organization will approve in writing the suitability of the person to whom livestock is to be intrusted on credit.

Conditions under which credit is granted. Purchases may be made either for cash, or partly for cash and partly for credit, but credit will only be given for a term not exceeding three years, and to the extent of not more than 75 per cent of the value of the animals. In the case of a returned soldier who has served overseas as a member of the Canadian expeditionary force, credit will be given to the extent of not more than 90 per cent of the cost of the stock purchased.

Stock is supplied under nine options, one dealing with purchase for cash, and the remaining eight with purchase on a part cash and part credit basis. In the case of credit purchases, settlement must be made on the following terms:

- (a) A cash percentage, according to the respective options, and a note for the balance, containing a lien on all animals supplied and, in case of females, their progeny also, in favor of the minister of agriculture, will be required. Unless otherwise specified, these notes will be payable, one-half at the end of the current year and one-half at the end of the next succeeding 12 months

- (b) Interest, at the rate of 6 per cent per annum before maturity and at the rate of 8 per cent per annum after maturity, will be charged on all accounts.

Animals supplied on credit must not on any account be resold or transferred without the written consent of the livestock commissioner, until such time as all outstanding indebtedness is fully liquidated.

ALBERTA

The Alberta cooperative credit act authorizes the formation of cooperative credit societies, for the purpose of lending money to farmers on joint municipal and government guarantee. The amount of municipal guaranty is fixed at one-half of the total amount of stock subscribed by the residents in the municipal district. Incorporation is gained by a petition signed by 15 agriculturists who have subscribed stock to the value of \$1,500, with 20 per cent paid in cash. Societies can not commence business, however, until there are 30 members with stock subscribed to the extent of at least \$3,000, with 20 per cent paid in cash. Payment of stock is made with 20 per cent cash, and promissory note at 6 per cent for the balance. Thereafter the stock is paid for at the rate of 20 per cent each year.

Borrowers from the society must pay interest at a rate not exceeding $7\frac{1}{2}$ per cent. Authorization is given to the directors to borrow temporarily sums not exceeding \$100 to cover immediate necessities.

Objects of the societies organized under the act are as follows:

- (a) To procure short term loans for its members for paying the cost of farming operations of all kinds and increasing the production of farm products and particularly for the following purposes:

- (1) The purchase of seed, feed, and other farm supplies;
- (2) The purchase of implements and machinery;
- (3) The purchase of cows, horses, sheep, and other livestock;
- (4) The payment of the cost of carrying on any farming, ranching, stockraising, dairying, or other like operations;
- (5) The payment of the cost of preparing for cultivation;

- (b) To act as agent for the members in purchasing goods, chattels, effects, stock, grain, coal, wood, lumber, merchandise, or any other article or commodity required by subscribers and in selling any

(Continued on page 154)

EXAMPLES OF FINANCIAL SUCCESS

R. E. Henderson, Uncompahgre project

AFTER just a few years' experience with irrigation we were thoroughly convinced that a heavy tonnage of crops could be produced, as 200 sacks of potatoes, 300 sacks of onions, 50 to 60 bushels of wheat, and 80 to 100 bushels of oats to the acre were common, and now, after 13 years' experience in the irrigation district of the Uncompahgre project, we attribute successful farming to four things, viz, sufficient fertilization, thorough cultivation, proper irrigation, and crop rotation.

The proper fertilizer for this district is barnyard manure, and in order to have a sufficient quantity for our ranch of 100 acres we keep 30 dairy cows, which, with the young stock, produce a large amount of fertilizer. We use all the straw produced on the ranch, as well as large quantities which we purchase from our neighbors for bedding for the stock, and that soon becomes fertilizer too.

Last spring, not having enough fertilizer of our own production, we hauled a large quantity from the Holly Sugar Co. feed yards at Delta, putting 500 tons on 45 acres of land.

Our principal crop at the present time is sugar beets. Last year land that had been properly fertilized produced 7 tons of beets more per acre than land with the same care produced without fertilizer, the fertilized land producing 18 to 20 tons per acre. Thorough cultivation begins with deep fall plowing of as much land as possible. This is followed by a covering of manure and then double-disked. Land to be plowed in the spring is first manured, then double-disked, plowed, and harrowed at least twice with driver on harrow, then rolled and seeded, and followed by seven or eight cultivations, as well as hand labor of Mexicans, six of whom are employed on our ranch. This system of plowing applies to all other crops besides sugar beets. Thorough cultivation conserves moisture, hence requires less irrigation.

Our present crop of beets, 41 acres, was cultivated seven to eight times before July 15.

Irrigation is an art learned only by experience and common sense, which teaches one *when* and *how* to irrigate.

Our dairy herd, beside increasing the productiveness of our land, brings us an income of over \$100 a year per cow, so it can be seen that the cow plays a large part in successful farming.

A large part of the feed is produced on the ranch, corn for ensilage, beet tops, alfalfa, some small grains, and tame grass pasture, the acreage of the latter to be increased until we shall have enough pasture for our herd.



A part of the dairy herd

Our ranch is divided into 12 or 14 plots. Our farming equipment consists of a complete set of up-to-date machinery, and power is furnished by seven strong horses. Some may think that that is too many horses for a small ranch, but when it is

taken into consideration that last year they moved 450 tons of beets, 100 tons of ensilage, 150 tons of beet pulp, 500 tons of fertilizer, 100 tons of hay, grain, mill feed, and numerous other things to be moved by horsepower, it will readily be seen that there is work for all. Seventy tons of milk were taken from the ranch by other means.

We are located on an electric light line which furnishes light for all our buildings, power for a milking machine, cream separator, and washing machine, and heat for range and irons.

One of the greatest hindrances to the success of our valley is the fact that we have too few home builders and too many tenants. One can not expect to reap crops from land that has nothing put back on it, and as the average tenant has poor improvements, must pay high rent, and plans to move, or at least *does* move to a new location nearly every spring, there is little opportunity or incentive to build up the land; hence many of our ranchers are in a deplorable condition.

By following the plans we have suggested we are able to produce crops, but the marketing end of the game is our most serious problem for all crops except sugar beets.

CANADIAN POINTERS FOR PROJECTS

(Continued from page 153)

products produced by subscribers and placing fire and hail insurance;

(c) To promote cooperation among its members for the improvement of conditions of farm life.

BRITISH COLUMBIA

As a means of encouraging a more rapid development of farm lands in the Province the government of British Columbia has passed legislation providing for loans to bona fide settlers on the security of their land. The following is an outline of the system adopted by this Province:

Purposes for which loans are made to settlers.—(a) For any purpose which, in the opinion of the board, will maintain or increase agricultural or pastoral production;

(b) For carrying out the objects of any association, subject to approval by order in council;

(c) For taking over, in whole or in part, subject to approval by order in council, any existing loan advanced by the Crown in right of the Province to any association, or any debentures issued by an association.

Conditions governing the application for and the granting of loans.—(a) Application

for a loan must be made upon the form supplied by the land-settlement board.

(b) The amount applied for must be neither less than \$250 nor exceed \$10,000; and in no case shall a loan exceed 60 per cent of the appraised value of the property offered as security.

(c) The rate of interest payable on loans at the date of this publication is 7½ per cent, payable half yearly.

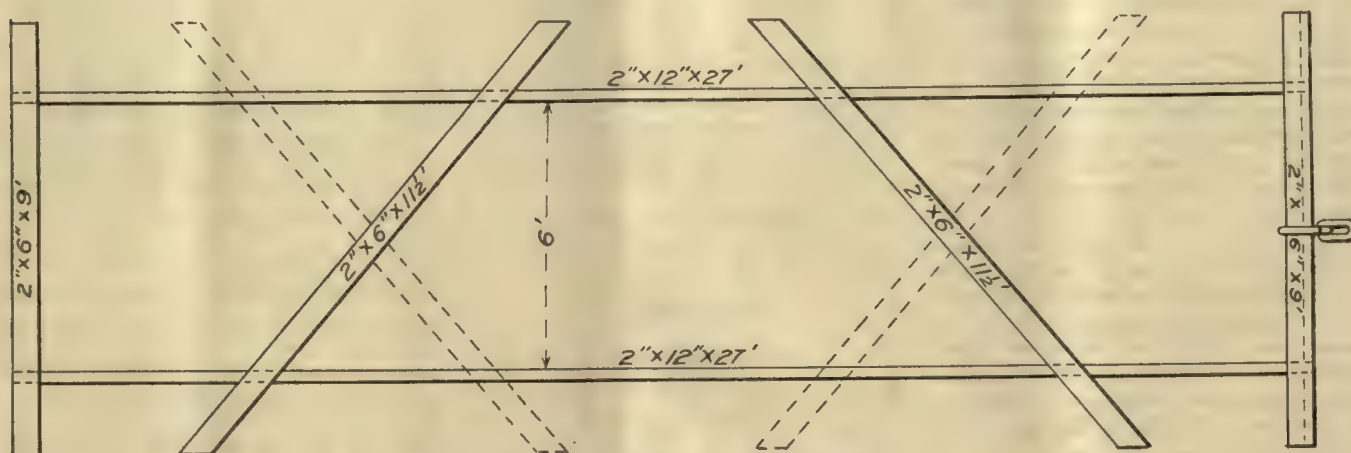
(d) Loans are made for either a long-dated or a short-dated term. Long-term loans shall cover a period of 15, 20, or 25 years, repayable on the amortization plan in uniform half-yearly payments of blended principal and interest. Short-term loans shall be made for a period of from 3 to 10 years, on such terms and conditions as the board may direct; the latter shall not exceed in amount \$5,000 to an individual, nor \$10,000 to an association.

(e) The board may accept as security for loans first mortgages upon agricultural lands in the Province, free from all incumbrances, liens, and interests other than those vested in the Crown. No loan may be made upon the security of unsurveyed land.

(f) Any borrower may pay to the board on the date of any installment one or more of the installments to come due at a subsequent date, in reduction of his debt.

PICTORIAL LESSONS IN PRACTICAL RECLAMATION

LESSON NO. 8.



Plan of land leveler used by J. S. Mills, Newlands project, Nevada

MR. J. S. MILLS, of Fallon, Nev., a water user on the Newlands irrigation project, has sent to the NEW RECLAMATION ERA the above sketch and the following description of his land leveler for the information of other water users:

"In the August RECLAMATION ERA is described a leveler for finishing land for irrigation. Some parts of the plan are excellent, but to some of them I say, in the words of the great Apostle, 'Behold, I show you a more excellent way.'

"First, as to length: 16 or 18 feet is not long enough for good work; 24 to 32 feet or even longer is best. A 16-footer drops into the low places without filling them. I built my latest one of the longest joists I could get at the lumber yards in two years of watching—27 feet—and it does much better work than the former 16-footer except in being a little more difficult to turn around.

"Second, the cross bars, we are told, should reach down flush with the side runners. Wrong, as every time the side runner hits a high hard spot it will rise and lift all the cross bars, leaving a high place in the field. The cross bars should extend about 2 inches below the side runners.

"Third, as to iron edges for the cross bars. Better omit them. They are durable and they cut better than wood in clean soil that is free from roots and trash, but usually they clog with the roots and plant stems and hold them in bunches so that the machine rides on them and cuts creases in the soil and digs out the low places as well as the high.

"The runners of my machine are 27 feet long, about 6 feet apart. The scraping members are 2 by 6, spiked flat on the under edges of the runners, the front one at right angles same as the rear, the other two at an angle of about 40° to 45°.

"If the driver usually turns to the left, the second and third scrapers should be set as shown in the diagram. If he turns to the right, they should be reversed (see dotted lines).

ADVANTAGES OF THE TRENCH SILO

1. Low cost for emergency construction.
2. Can be constructed where pit silo can not.
3. Ease of filling and removing silage.
4. Ease of adding water.
5. Frost-proof and fireproof construction.
6. Does not require expensive machinery or a large amount of power for filling.
7. Renters can build a silo with little cash outlay.
8. Is adaptable for other uses such as vegetable storage or manure pit.
9. Machines that cut silage in the field as corn is cut should be especially adapted to use with this silo.—North Dakota Agricultural College Circular 62.

"The scraping 2 by 6's do better cutting for being set at an angle, clear of trash better, and serve as braces for the machine, no other braces being needed. The spaces above the cutters should be filled with inch boards set at an angle of about 45° or the dirt will pile up and make too heavy a load for even four horses.

"I use a 2 by 6 on edge in front of the forward cutter, erect, but wish it were at an angle. Four pieces of 2 by 4 six feet long are nailed across the top to support the two floor boards which reach from the front back to the third cutter and one at rear. To the bottom of the runners near the front are nailed 2 by 2's to smooth the land when turning around."

POISONOUS GASES FORMED IN SILOS

Farmers are warned by the United States Department of Agriculture that poisonous gases formed in silos overnight while in process of being filled are deadly. Freshly cut silage in a partially filled silo produces a poisonous gas. If there is no circulation of air, this gas remains in considerable volume. Death may result from entering a silo containing the gas.

As a precautionary measure it is recommended that the blower of the ensilage cutter be run for a few minutes before anyone enters the silo. Air currents stirred up by the blower will dilute the gases sufficiently or drive them from the silo. It is then safe to enter.

ECONOMIES IN PERSONNEL, TRAVEL, AND PRINTING

President Coolidge's call for economy in Government administration meets whole-hearted response by Secretary of the Interior and Commissioner of Reclamation

IN pursuance of the urgent request of President Coolidge for cooperation on the part of Government officials in a program of economy, with particular reference to personnel, travel, and printing, the Secretary of the Interior has approved the following circular letter which has been sent by Commissioner Mead to all field offices of the Bureau of Reclamation:

AUGUST 20, 1924.

The World War put Governments on an annual expenditure basis of unprecedented magnitude, causing an equally extreme need for governmental economies. The marked success of our Government in coping with these problems of curtailing expenditure, reducing public debt, and lowering taxes has excited world admiration, but there is still need for strict economy, and the President has called for cooperation of all public servants to that end. He has cited three items of expenditure that call for reduction:

You, with your intimate knowledge of the details of your work, know where further practical economies can be effected. I desire, however, that you give especial attention to the matter of personnel. This is by far the most costly item in our expenditures. We must reduce the Government pay roll. I am satisfied that it will lead to greater efficiency. And

in this same connection I desire careful scrutiny of travel orders. Our travel expense item is too great. An order for travel should be given only when absolutely necessary. You can effect economy in this item. A further fertile field for economy is the item of printing and binding. I am sometimes startled at the number of Government publications which come to my attention. It can not be that all are necessary.

The President's policy is our rule of action. It remains merely to interpret and apply it intelligently.

PERSONNEL

Every feasible curtailment of pay rolls should be made that is possible without impairing Government investment or essential service. In this and other features the Bureau of Reclamation differs from the typical Government agency. The work of operating irrigation systems is by nature seasonal, so that the employment peaks and wanes annually. Our total number of employees has varied more than 100 per cent within a year.

Our forces also vary sharply from year to year in accordance with available funds and program of work. Construction work is done but once; related forces newly assembled soon reach a peak and disband as the job is finished. The individual

turnover is large. In the summer of 1915 total forces exceeded 8,300. In December, 1919, they were less than 2,400. By the summer of 1921 the total had increased to 4,400. In June, 1922, it was less than 3,600. This summer it is about 4,000.

These total figures are made up largely of common labor and indicate in a general way that such forces fluctuate in accordance with needs of the work. Every care should be taken to reduce labor to the minimum required.

Particular attention is called to employments in educational and registered positions. These have not been curtailed proportionately. It is appreciated that an overhead organization can not always be proportioned to total force or expenditure, but the records suggest that more attention should be given to this element. In June, 1915, of a total force numbering 8,370, only 580, or less than 7 per cent, were educational appointees, and 1,740, or about 20 per cent, were registered positions; over 70 per cent was unclassified labor. In June of this year the total force had shrunk more than 50 per cent but unclassified labor was only 58 per cent of the total. The educational force had reduced 150 but was 11 per cent of the total. The registered employees

(Continued on page 157)



More than 600 schools provide educational facilities for the army of project school children

ECONOMIES IN PERSONNEL, ETC.

(Continued from page 156.)

were one-third less in gross number but more than 30 per cent of the total. All field officers in charge of personnel are hereby requested to make a study of present forces in educational and registered positions, and to make reports through regular channels of possible reductions, having in mind the need of carrying out the President's idea to the fullest extent consistent with continuance of the necessary service and execution of approved plans.

TRAVEL

Travel is expensive. Few employees can engage in any productive work while actually traveling, yet during that time the Government is incurring expense not only for travel but for salary. Often there is a further indirect expense due to absence from regular post of duty and resulting delay. The travel authority is tempting to some people. It is readily susceptible of abuse. It is peculiarly subject to criticism. For all these reasons travel should be kept to an absolute minimum.

In the case of the Bureau of Reclamation this is emphasized by an unusual need for economy, and because of the large area over which the Federal reclamation work is scattered—the great distances between projects. Travel expense incurred on the plea that there is not time for arrangement by correspondence raises a presumption of lack of foresight. All work should be planned sufficiently far in advance to avoid such travel.

In what follows statistics for the fiscal year 1923 are used. For that year budget data show travel expense of about \$100,000, but this does not include cost of operating Government automobiles and some other incidentals.

BY COMMON CARRIER

The bureau paid common carriers \$41,000 for transportation of 1,371 persons, including 995 laborers who were carried to the job with the usual agreement for hold back of travel cost unless they worked for a certain time. The remaining travel involved from 1 to 33 trips per person; the related per diem and other travel allowances amounted to \$17,000.

The bureau now has 57 general travel orders outstanding. This list will be scrutinized for possible reductions; please make recommendations in appropriate cases.

Hundreds of other employees are issued special travel orders by holders of general orders. These have been used here

mainly for satisfaction of accounting and auditing requirements. They should be carefully considered from the administrative viewpoint of their necessity and wisdom.

BY GOVERNMENT AUTOMOBILE

The bureau ran 441 cars over 3,000,000 miles at an operating cost of \$233,000, or about 2 per cent of the total amount charged to construction and operation costs on the Government projects for that year. Due to the wide variety of controlling circumstances it is difficult to draw safe conclusions from statistics on this subject, but these show marked differences in unit costs and should be carefully studied locally with a view to eliminating all waste involved in the number of cars and operating expense.



An alfalfa meal mill on the Minidoka project, Idaho

BY PRIVATE AUTO

The Bureau of Reclamation has a special authority to pay for official use of private motor cycles and automobiles. This provision can work considerable economy. It is likewise susceptible of abuse. The authority should be very cautiously used. In general, where travel can be made by common carrier that means should be used, as the payment for use of private machine should be limited not only by the price set in the law but by what it would cost to travel by common carrier. This double restriction should apply in all cases where the travel is for a long distance, as where an employee is transferred from one project to another. Special travel orders are required in every case where this provision

is used, and these will be carefully scrutinized. Please report statistics on the use of this authority during the fiscal year 1924, giving the names of employees, mileage, and payments, with suitable remarks or explanatory discussion.

PRINTING

The purpose of many Government agencies is largely served by publication. The Bureau of Reclamation is not in that category. Its publications are largely for practical purposes connected with its work, such as printed plans and specifications for letting contracts. Its printing bill is relatively low, averaging in recent years less than \$30,000. Since all printing must be approved at Washington, this item can be controlled here.

SUMMARY

The foregoing figures for the three items under discussion are largely for the fiscal year 1923. Figures for the fiscal

year 1924 are being compiled. It is expected that the aggregate cost of the three items will show a reduction during the fiscal year just begun.

ELWOOD MEAD, *Commissioner*.

Approved, August 16, 1924.

HUBERT WORK, *Secretary*.

A carefully worked-out cropping system will provide for the maximum amount of good pasture, one of the greatest aids to successful feeding of livestock.

The selection of good animals is important, whether they are to be fed for market or kept on the farm.

USE OF ELECTRICITY ON AN ENGLISH FARM

Dr. George Otis Smith, Director of the Geological Survey, who attended the recent World Power Conference in London, reports to the Secretary of the Interior

AT the World Power Conference in London it was noticeable that the contribution of the United States to the power program was on the larger topics of power resources, steam generation, electro-metallurgy superpower installation, hydroelectric efficiency, long-distance transmission, and public utility regulation, whereas delegates from other countries presented more of the papers discussing utilization of power in a small way.

Director Smith's report to Secretary Work reads, in part, as follows:

"It was because of the opportunity to examine such small unit operation that I visited the farm of R. Borlase Matthews, who is without doubt the leader in England as an electric farmer. His farm, Greater Felcourt, East Grimstead, is near where the counties of Surrey, Sussex, and Kent come together and only a few miles out from the famous race course of Lingfield, and Mr. Matthews is an inventor, economist, and truly progressive farmer who mixes brains with the soil.

"Fancy pork, standard eggs, and certified milk are the three chief products sold from this 600-acre farm, much of which is cut-over land, the result of war demand for timber, and nowhere is the soil especially favored by nature. But to the conversion of common soil into these essential food products electricity is applied in every possible way, even to the extent of making bees work out of season and hens work overtime.

"Electricity furnishes heat, ventilation, and moisture control in egg hatching on a large scale, and is further applied to egg production in the automatic control of the electric lights with which the 550 hen houses are all equipped, the lights having the latest type of diffused reflectors. An automatic astronomical switch takes the place of human care, and the hens have an allotment of only 10 hours sleep out of the 24. With this longer working day in the winter egg production is increased 20 per cent above the normal.

"In the electric-lighted dairy, with 50 milch cows, electric milking machines are used and Mr. Matthews finds that electric lights in a cow barn pay for themselves in the saving of spilt milk, especially as the certified milk is sold for double the price of ordinary milk.

"The question has been raised by visitors to the Matthews farm as to the ethics of making hens as well as bees work overtime. But another one of his electrical propositions is beyond question of

attack. Mr. Matthews makes hay when the sun doesn't shine. The electric making of hay, as he practices it, is not a matter of electric heating or curing but rather a ventilating process. The green hay is brought to the large mows 60 by 20 by 25 feet high directly from the field as cut, and is built up as cured hay would be put into the mow, except that the mow is provided with air ducts and built-up flues. As the green hay begins to heat, this is detected by the thermometers and the temperature is kept under control by electric ventilating fans.

"The cost of actual production of electrical energy is in many cases a relatively small item as compared with the costs of transmission, distribution, and transformation. It is easy to understand, therefore, that with the long-distance transmission required and the relatively small number of consumers per mile of transmission, American agriculture can not hope to generally secure central-station electrical service at urban rates as long as there is no greater rural consumption of electrical energy than that incident to lighting and the miscellaneous small belt and shaft jobs in the house and around the farmyard. The only way to lower the cost of central-station energy to a rate at which its general use in agriculture is profitable is to increase its profitable agricultural use to such an extent that the resulting load corresponds to a reasonable rate of profit for both the central station and the individual farmers."—R. W. Trullinger, specialist in rural engineering, Department of Agriculture.

"Bacterial action is thus stimulated but kept under control, and not only is there independence of the sun in the process but the product is said to be better. A 5-horsepower electric fan is sufficient to cure the hay in a 100-ton mow, and the actual operation is only 1½ hours a day for 9 days. After the hay has been electrically cured, the same portable motor is used at another point for curing grain, which is taken direct from the binder to the rick and cured by this method. Time and labor losses are thus avoided and the land cleared for immediate plowing, while the product is wheat that brings a better price from

the millers, barley that is regarded as better suited for malting, and oats that are at least better looking than if field cured. The experiment was also tried of thus curing field peas, with the result that they turned out green in color rather than brown.

"Electricity is also used in the preparation of silage. The base of the silo is wired, so that artificial heating of the fresh silage is possible, the quicker action resulting in superior quality and a silo juice that is good for the cows instead of being a waste product.

"Mr. Matthews is now engaged in equipping a high-tension electrical unit for stimulating plant growth. This phase of electric culture is still in the experimental stage, but is to be applied on a practical scale. Mr. Matthews's experience has shown that electric plowing can be done at less than one-half the cost of plowing by a tractor and of course with even a greater saving over the horse plow. He makes the point that it is necessary in educating the farmer to use electricity to talk in plain language.

"His statement that a cream separator can be run 30 hours for a penny's worth of electricity means more to the farmer than any statement in terms of electrical units; or, again, that electric power on the farm costs less than one-half that of an oil tractor, only one-fourth that of horse power, and only one-seventeenth that of man power. He believes, therefore, that the evolution from man power to horse power and then the use of the gasoline or fuel-oil engine will continue with the adoption of the electric motor, with its higher efficiency and relatively small upkeep expense. With cheaper electricity and higher wages in the United States than in England the ratio of economy in this country is of course even greater."

"I congratulate you on the excellent magazine you are publishing for the water users on national reclamation projects."—*C. R. Thomas, publisher, the National Reclamation Magazine.*

The heavy expenses which have to be incurred in changing raw land into small improved farms make it desirable that plans for securing and advising settlers be carefully thought out.

CROP CONDITIONS ON THE PROJECTS

AUGUST, 1924

Yuma project, Arizona-California.—Threshing of alfalfa seed was about completed and the yield was unusually large. The cotton yield promised to be above the average. About 400 bales had been ginned. The latter part of the month the price dropped to 22 cents per pound. All other crops were in good condition and the financial conditions of the farmers showed further improvement.

Orland project, California.—The almond harvest was virtually completed, the yield amounting to about 60 per cent of last year's production. Advance price quotations varied from 9 to 18 cents per pound, indicating a remunerative return for the crop, three carloads of which were shipped during the month. Orchards were withstanding the drought fairly well and permanent damage will be limited. Tank wagons were being used to water young orchards.

Grand Valley project, Colorado.—Digging of potatoes was completed except for a small acreage of late varieties. Sugar beets were expected to make a satisfactory yield where given proper care, but some fields were neglected owing to the shortage of contract labor. The third cutting of alfalfa was nearly ready to harvest. The Bartlett pear harvest was completed and picking of Elberta peaches was in progress. The shipment of peaches from the Palisade district will be the largest in the history of the project, estimated at 1,100 cars. In general, it was expected that crop yields and prices will be favorable and conditions were fully up to what may reasonably be anticipated in an average year.

Uncompahgre project, Colorado.—The crop outlook continued promising. Grain threshing was in progress and wheat was moving to market at prices ranging from \$1.75 per hundredweight for hard wheat to \$1.10 for soft. Onion growers will suffer a decreased yield owing to lice, and some fields of sugar beets planted late have been seriously affected with the aphid. The outlook for all crops was promising. Hay should bring a good price owing to drought conditions on the surrounding ranges.

Boise project, Idaho.—On land receiving late water the third crop of alfalfa was making excellent growth. Grain yields were better than expected. The price of wheat declined from \$2.10 to \$1.85 per hundred pounds. Prune picking was in progress and reports indicated a short crop. Good prices were being offered for apples.

King Hill project, Idaho.—A very good third cutting of alfalfa hay will be harvested. The alfalfa seed crop is valued at about \$75,000. Potato prices decreased steadily until digging was stopped. About 140 acres of fall lettuce were planted.

Minidoka project, Idaho.—Good yields of potatoes were looked for, but the price was low. The quality of wheat was better than usual, though the yields were somewhat smaller. Sugar beets will make a poor showing owing to attacks of the white fly and lack of late irrigation. The average yield per acre was estimated at 7.14 tons as compared with 12.5 last year.

Huntley project, Montana.—Harvesting of grain was virtually completed, with yields above the average. Beets were doing well and the average crop was expected. A severe hailstorm damaged an area of about 2 square miles northwest of Worden, resulting in a total loss of the bean crop there and reducing the beet yield about 2 tons per acre.

Milk River project, Montana.—The second cutting of alfalfa was virtually completed and the blue joint hay crop was in stack. Threshing was well under way. A large percentage of the beet crop was in excellent condition.

Sun River project, Montana.—On the Fort Shaw division the second cutting of alfalfa was in excellent condition and a good yield was anticipated. Grain crops will be above the average of former years. On the Greenfields division alfalfa fields made a fine showing. The principal crop was wheat, and the yield will range from

40 bushels per acre down to crops not worth harvesting.

Lower Yellowstone project, Montana-North Dakota.—All crops were in excellent condition. Two cuttings of alfalfa were in the stack. Peas were harvested and beans were being pulled. Corn was much later than usual, and many fields will not mature except for silage and fodder. Sugar beets were making rapid growth and promised higher yields than ever before. Grain crops were virtually all harvested and threshing was in progress. The yield of wheat ranged from 20 to 40 bushels per acre.

Newlands project, Nevada.—Virtually all grain had been threshed and the yields were excellent. Prospects were good for a heavy third cutting of alfalfa. Sales had been made at \$12 to \$15 per ton in the stack, but many growers were holding for higher prices. The cantaloupe yield was heavy and prices good. One grower shipped 1,700 crates from 7 acres, at \$2.50 per crate, with prospects for 400 additional crates. Another grower, with about 35 acres, refused \$10,000 for his crop on the ground. He expected to be shipping 1,000 crates a day by the end of the first week in September.

Carlsbad project, New Mexico.—The cotton crop in general gave promise of unusually large yields. Several bales had been picked and ginned at the close of the month. The yield of later crops of alfalfa was very good, with prices ranging from \$17 to \$18 per ton f. o. b. project. Threshing of alfalfa seed was in progress, the yields averaging from 450 to 650 pounds per acre, at 15 to 16½ cents per pound.

Rio Grande project, New Mexico-Texas.—This year there are 63,300 acres in cotton which should be worth about \$8,500,000.

(Continued on page 160)



Up to the end of August 700 carloads of cantaloupes had been shipped from the Rio Grande project, New Mexico-Texas, the greater portion from the Mesilla Valley

F. E. WEYMOUTH LEAVES BUREAU OF RECLAMATION

F. E. Weymouth has resigned as chief engineer in the Bureau of Reclamation to accept private employment at a greater salary, which is understood to be double what the Government paid him. His long connection with the Federal reclamation work in responsible positions and wide acquaintance in the West will cause much regret at his departure.

Mr. Weymouth's engineering work has included a variety of connections—city work in Massachusetts, waterworks in Canada, canal surveys in Nicaragua, and railroad work in South America—but his professional work has been mainly with the Bureau of Reclamation and demonstrates that there are at times in the civil service opportunities for a career of distinction.

A month after the reclamation act was passed in 1902 Mr. Weymouth was engaged by the Reclamation Service and assigned to surveys in the West, mapping reservoir sites, canal routes, and irrigable lands. When the Service began construction work he was assigned to that and built dams, canals, and other works in the Northwestern States. One promotion after another followed. One of his most notable achievements was the Arrowrock Dam in Idaho, highest in the world, which was built under his supervision with a saving under the estimate of a year in time and a million dollars in cost.

From the position of supervising engineer in charge of work in Idaho and vicinity Mr. Weymouth was called to Denver, Colo., in 1916 as chief of construction for all the reclamation work. In 1920 he was made chief engineer, supervising work in all the reclamation States, involving thousands of employees and the expenditure of millions of dollars annually in the investigation, construction, and operation of irrigation systems. The regard in which Mr. Weymouth was held by his associates is expressed in the following letter from Dr. Elwood Mead, Commissioner of Reclamation, accepting his resignation:

Your acceptance of private employment at a substantial increase of salary must be regarded as a deserved promotion and the organization of this bureau will take pride in that fact; but your associates in the reclamation work will also feel keenly the loss to the organization and to them personally. In my relatively brief connection with the bureau I have learned how completely you have enjoyed the professional respect and personal affection of project officials and others connected with the work.

Your resignation, effective at the close of October, is therefore accepted with sincere regret that the Government loses your services, but with pleasure in the fact that their value is being recognized and with hearty best wishes for the future.

CROP CONDITIONS ON THE PROJECTS

(Continued from page 159)

The first bale ginned brought 30 cents a pound and a bonus of \$150. Approximately 700 carloads of cantaloupes had been shipped, the greater portion from Mesilla Valley. About 40,000 boxes of pears, valued at \$90,000, were shipped from El Paso Valley through the El Paso Valley Pear Association. The third cutting of alfalfa resulted in a good yield and sold at \$23 per ton.

Williston project, North Dakota.—The grain crop was virtually all cut. Yields appeared to be the best since 1912. The sugar beet crop promised an average yield despite the abnormal season and the inexperience of the growers. The general condition of the farmers was much better than it has been for several years.

Umatilla project, Oregon.—Several carloads of melons and cantaloupes were shipped and a fairly good market has been developed for these crops. Harvesting of the third crop of alfalfa was under way. The higher price for hay has resulted in a slightly more optimistic feeling among the farmers. Interest has been aroused in peppermint culture, and should soil and climate prove suitable, it is possible that a new and profitable crop will be introduced on the project next year.

Klamath project, Oregon-California.—The hay crop was much better than usual,

yielding two good cuttings and in many cases three. On Tule Lake leased land 70 per cent of the area planted to grain will yield good crops of grain or hay.

Belle Fourche project, South Dakota.—Small grains were harvested and threshing was in progress. The hot weather helped the corn, and with good growing weather a fair proportion of the crop will mature. Most of the sugar-beet crop was in the path of a severe hailstorm on August 15 and was considerably damaged. The second cutting of alfalfa was harvested and in some places a third cutting was under way. Potatoes and gardens showed up well in areas not reached by hail.

Strawberry Valley project, Utah.—The condition of all irrigated crops was good. The third stand of alfalfa was above average. Peaches and pears were being picked, showing good crops and fair prices. Tomato-canning factories were in full operation. The sugar-beet crop improved somewhat, but the crop will probably be below average in tonnage per acre. In general, however, the present outlook for the project farmers is better than at any time since 1920, and net returns per acre will probably be from 25 to 40 per cent greater this year than last.

Okanogan project, Washington.—The apple crop was estimated at 25 to 40 per cent of that of last year owing to continued hot, dry weather and scarcity of water for irrigation. A few carloads had been sold at a fair price, indicating some profit to the growers.

Yakima project, Washington.—The third cutting of alfalfa was being harvested on the Sunnyside division, and Jonathan apples were being picked and shipped from lower valley points. The pear and peach crops were virtually all harvested. It was estimated that 6,000 tons of pears had been shipped and as much more was being held in storage. The average price to growers was about \$70 per ton. The apple crop will amount to about 10,000 cars, and the gross return to the valley, owing to the increased price, is estimated at about \$12,000,000.

Shoshone project, Wyoming.—Much of the second cutting of hay had been put up and harvesting of cereals had begun. Sugar beets made an unusual growth, and most of the beans advanced sufficiently so that there was no longer much danger from frost. Some early potatoes had been harvested, but owing to rather low prices there was not as much activity in this line as at the corresponding time last year.

STUDY OF PRODUCTS BEATS FREIGHT RATES

The other day a water user on one of the projects said, "I am changing my policy. I have been using a lot of time and energy howling about freight rates. Hereafter I am going to beat the railroads to it. I am going to produce on my farm as nearly as possible what we eat and use and also see to it that we produce stuff that can either be sold near home or sold in a concentrated form."

He had been doing some figuring and had discovered that the transportation charge on grains, hay, and potatoes from his farm to market is from 22 to 90 per cent of the final price, but that on livestock and poultry and their products the charge is only from 6 to 12 per cent. He said further, "The freight I paid on last year's hay would have bought enough feed to grow a carload of 85-pound lambs, which could have been placed on the market at a cost of one-tenth as much as it cost to put the hay on the market."

RECLAMATION LAW NOTES

AN applicant who has been granted a water right under a Federal irrigation project, in connection with a reclamation homestead application, for land within a petroleum reserve, is entitled, upon withdrawal of the application rather than accept a surface patent, to repayment of the water charges, where he had no knowledge of the petroleum withdrawal and the public notice pursuant to which he made payment failed to state that any of the land was within a reserve. (*Dorsey L. Rouse, Shoshone project, 50 L. D. 379.*)

Lands acquired by the Government for a Federal irrigation project, by purchase or condemnation pursuant to section 7 of the national irrigation act of June 17, 1902 (32 Stat. 388), when no longer needed for reclamation purposes, can be disposed of only at public auction, and the proceeds derived therefrom must be placed in the reclamation fund to the credit of the particular project. Such lands and the oil and gas deposits therein are not subject to prospecting or lease under the act of February 25, 1920 (41 Stat. 437). Public lands, withdrawn for a Federal irrigation project reservoir, which can not be restored to the public domain without damage to the project, or which have, because of improvements placed thereon, become lands that may be sold only for the benefit of the reclamation fund, are not subject to the operation of said act of February 25, 1920. Public lands withdrawn for a reservoir site, or other similar purpose, which contain deposits of oil or gas, may be restored and leased pursuant to the act of February 25, 1920, where their restoration can be effected without damage to the project, or unless, because of improvements placed thereon, the lands have become subject to disposition only by sale for the benefit of the reclamation fund. Lands reconveyed to the United States by the State of New Mexico for reclamation purposes pursuant to the enabling act of June 20, 1910 (36 Stat. 557), which contains an indemnity provision as consideration for such transfers, occupy a status similar to that of withdrawn public lands, rather than that of lands acquired by purchase or condemnation, and the granting of permits to prospect for oil or gas upon such lands will be dependent upon the determination of whether or not their restoration will be detrimental to the

project. Lands withdrawn for a reservoir site or similar reclamation purposes which are essential to the project, and lands acquired by purchase or condemnation for the exclusive use of the project, may be developed for their mineral resources only by temporary leases for periods not inconsistent with the needs of the project, and the proceeds therefrom must be placed in the reclamation fund to the credit of that project. (*J. D. Mell et al., Carlsbad project, 50 L. D. 308.*)

The Union Electric Co. maintains a dam and reservoir in Montana for impounding water for the development of electric energy. Water from this reservoir is dumped into a ditch below the dam. An accumulation of ice and snow in the ditch prevented the water from passing down to the Beaverhead River, and caused it to overflow the banks of the ditch and the lands of John Butala. The latter brought action against the company for trespass. In *Butala v. Union Electric Co.* (226 Pac. 899) the Supreme Court of Montana directed the dismissal of the cause, on the grounds that the business of the Union Electric Co. was lawful; that the company had the legal right to construct the dam, impound the water, cause it to flow over its water-wheels, and to dump it into the ditch, all of which it did in a proper manner; that Butala's injury resulted from another and wholly independent cause, i. e., the accumulation of ice and snow in the ditch in such quantities as to prevent the water from passing down to the river; that the result did not flow directly from the company's act, but was only consequential, and therefore Butala did not show a trespass upon his land by the company.

The power to correct surveys of the public lands belongs to the political department of the Government, and the Land Department has jurisdiction to decide as to such matters while the land is subject to its supervision, and before it takes final action. This power of supervision and correction by the department is subject to the necessary and decided limitation that when it has once made and approved a Government survey of public lands, and has disposed of them, the courts will protect the private rights acquired against interference by corrective

surveys subsequently made by the department. A resurvey by the United States after the issuance of a patent does not affect the rights of the patentee; the Government, after the conveyance of the lands having no jurisdiction to intermeddle with them in the form of a second survey. And although the United States, so long as it has not conveyed the land, may survey and resurvey what it owns, and establish and reestablish boundaries, what it thus does is for its own information and can not affect the rights of owners on the other side of the line already existing. (*United States v. State Investment Co., 264 U. S. 206.*)

The departmental rule that where a desert land entry upon which final certificate had not issued is acquired by an assignee through mesne transfers, that assignee, if qualified, is entitled to hold the entry, although the intervening assignees were not qualified to take an assignment, is applicable prior to payment of final commissions to reclamation homestead entries upon which final proof of compliance with the ordinary requirements of the homestead law has been submitted and accepted. The limitations imposed on assignments of reclamation homestead entries are limitations not on the qualifications of the assignee but on the right of the assignee to receive water. Where land within a reclamation homestead entry is included within a petroleum reserve prior to payment of the final commissions, the entryman must consent to take a restricted patent as provided by the act of July 17, 1914 (38 Stat. 509), or apply for a reclassification of the land, and, in the latter alternative, the showing as to its mineral character must be as of the date of the payment of the final commissions. (*Amos N. S. Kelly, 50 L. D. 268.*)

Where a land owner within an irrigation district in Idaho has an old water right and the district provides an additional right for him by virtue of a contract with the United States Government, he can not be compelled to use the old water right on part of his land and the additional right on another part, but he may use the combined water right on any or all of his land within the district. (*Nampa and Meridian Irrigation District v. Petrie et al. (Idaho), 223 Pac. 531.*)

The relief that can now be afforded on existing projects is to classify the lands upon the basis of a scientific survey and place equitable charges upon each class in proportion to its power to produce.

AUSTRALIA LAUNCHES IRRIGATION SCHEME

Early in July the governor of Queensland, Australia, officially opened the first section of the Dawson Valley irrigation scheme, stated to be one of the largest and most important irrigation settlements ever attempted.

The dam will rise 130 feet above the summer level of the Dawson River and will have a crest length of 860 feet. The cost will be more than \$10,000,000. The storage capacity will be 2,485,000 acre-feet. The reservoir will supply water for 200,000 acres of first-class agricultural land and 2,000,000 acres of pastoral or stock land, all of which is at present unused. In December, 3,150 farms will be thrown open to settlement.

The irrigation scheme has been designed on the zone system; that is, intensive cultivation blocks in the center, with farms of increasing size as the distance from the center increases.

A hydroelectric station at the dam will generate sufficient power to supply light, power, and water for the whole area.

It is planned to publish in a later issue of the NEW RECLAMATION ERA a comprehensive statement concerning this irrigation scheme from Hon. E. G. Theo-

QUALIFICATIONS FOR SUCCESS AS FARMER

J. R. Howard, of Chicago, former president of the American Farm Bureau Federation, in a recent address before the farm lands division of the National Association of Real Estate Boards, stated that "the young man who contemplates the purchase of a farm has got to have the natural inclination and disposition, moral fiber, strength, patience, and other qualifications to make a success as a farmer. He has got to be 'farmer-minded' and find his greatest satisfaction in the planting of the seed and its development into useful plants, and taking young livestock and growing it into valuable animals. The farmer to-day if he succeeds has got to be an educated man. When I was a kid, a boy unfit for anything else could settle on the farm. To-day things have changed, and we let the boy who is not smart enough to be a farmer go to town and be a banker or lawyer, because it takes more brains to run a farm than a bank."

SALT RIVER LAND VALUE RAISED \$15 PER ACRE

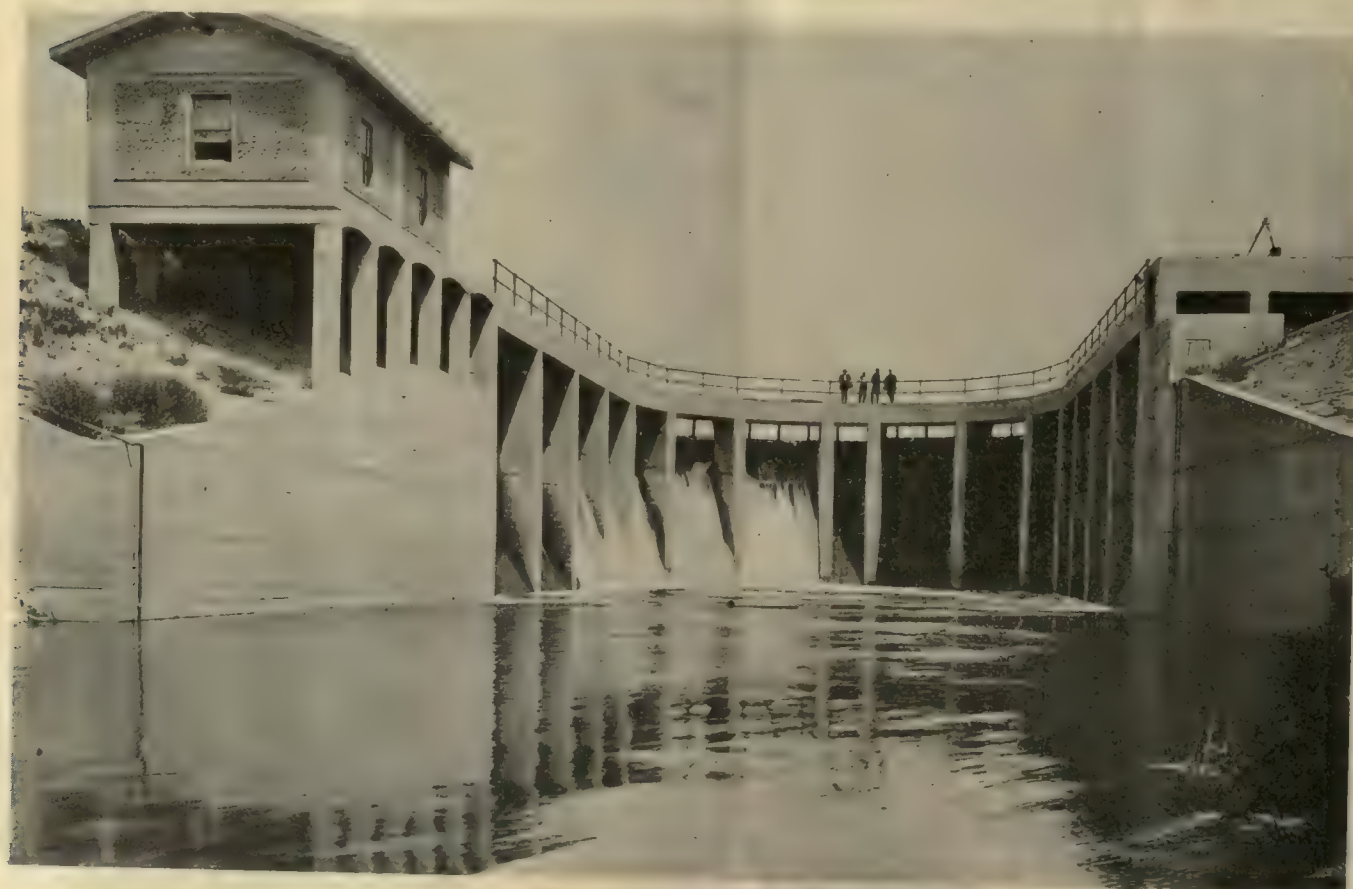
The Associated Arizona Producer states in its issue of September 1, 1924, that the following telegram was received on August 27 by F. W. Reid, president of the Salt River Valley Water Users' Association, from J. F. Johnson, State superintendent of banks.

Valuation two hundred forty thousand acres of land coming under the Salt River Valley Water Users' Association project, as reappraised by the office of the superintendent of banks of the State of California, placed at forty-two million dollars.

"This is an increase in value over the appraisal of last year of nearly \$10,000,000. The last appraisal was based on 205,000 acres, and was \$32,700,000. The new appraisal is \$15 per acre higher."

dore, premier, Queensland, Australia, including settlement plans, size of farms, terms on which payment by the settlers is to be made, credit extended by the government to the settlers, and character of agricultural advice given to them.

Salt should be accessible to farm animals at all times.



Lost River diversion dam on the Klamath project, Oregon-California

CHARLES H. FITCH RETIRES FROM BUREAU

On September 11, 1924, Charles H. Fitch of the Washington office of the Bureau of Reclamation, retired at the age of 70.

In 1872 Mr. Fitch was appointed an aid in the Coast Survey and later served as deputy surveyor, topographer, and investigator in Texas, Colorado, California, South Dakota, and Indian Territory; as assistant chief of the surveying division of the General Land Office; and as an employee of the Bureau of Reclamation from the time of its establishment in 1902. In 1911 he was made project engineer of the Salt River project, Arizona, and in 1916 was appointed chief clerk of the Washington office.

On his retirement from the Government service the employees of the Washington office presented Mr. Fitch with a gold watch and chain suitably inscribed, and Commissioner Mead wrote to him as follows:

Your retirement from the Bureau of Reclamation marks the end of many years of honorable service with the Government—years upon which you can look back with the consciousness of having done your part to the utmost of your ability in upholding the high standards of Federal employment.

I can not let this occasion pass without voicing the hope of myself and your many friends and associates that the years to come hold for you a full measure of opportunity for service and that you will be blessed with a long and useful life.

Mr. Fitch also received the following letter from Secretary Work:

On the occasion of your retirement from the Government service, I believe it is only fitting to express to you my high appreciation of your long and faithful service.

You have at all times performed the duties of your various positions conscientiously and well, and your example has been an inspiration to your associates.

It is my hope that the milestone which you have reached, although it marks the termination of your service with the Government, may point the way to a future replete with the good things of this life.

Reclamation by irrigation is the result of the joint efforts of the engineer and the farmer. The engineer builds the irrigation works, the farmer must pay for the works and make a living from the reclaimed lands.

There can be no irrigated farm without the competent engineer, but there will be no payment for the works, nor community development under them without the successful farmer.

FARM COST ACCOUNTS HELP FARM BUSINESS

Should farmers figure? Farming is a business and farmers, like other business men, should keep records of their transactions. The value of records is best revealed in their usefulness. The aim of every farmer is to make money. Farm cost records show the net farm profit, and they serve as a guide in making changes which increase the farm profits. A farmer who keeps records can pick his farm business to pieces, item by item; find out what mistakes he is making and why he is losing money; and then make changes which "stop the leaks" and put his farm on a paying basis.—North Dakota Agricultural College Circular 61.

PER CAPITA TAX BURDEN IS HEAVY ON FARMERS

The following extracts are from a letter of June 6, 1924, from Hon. Huston Thompson, chairman of the Federal Trade Commission, to the President of the Senate, submitting a report on taxation and tax-exempt income, in response to Senate Resolution 451, Sixty-seventh Congress, fourth session, printed as Senate Document No. 148, Sixty-eighth Congress, first session:

"Between 1912 and 1922 the aggregate net debt of the United States, the States, and the local governments increased more than sixfold, and was nearly \$32,000,000,000 in the latter year.

"The aggregate of national, State, and local taxes was heaviest per capita among the North Atlantic, Rocky Mountain, and the Pacific States, but it was most burdensome to agricultural communities, particularly in the wheat-raising States, which suffered from an unprecedented price decline for their products, while the general price level remained high. Reflecting the economic distress of the agricultural population, the mercantile and bank failures in Idaho, Kansas, Nebraska, Iowa, the Dakotas, and Montana increased from 1919 to 1924 in much greater proportion than in the country as a whole. Nearly one-fourth of all the farmers in Kansas and Iowa, nearly 3 out of every 10 farmers in Nebraska, nearly 4 out of every 10 in South Dakota, over half those in North Dakota, and 5 farmers out of every 8 in Montana have either lost their pr p-

FARMERS' CONDITION SHOWS IMPROVEMENT

The financial position of farmers as measured by the exchange value of their products for nonagricultural commodities, including clothing, fuel, metals, building materials, and house furnishings, is gradually working toward a pre-war parity, according to the September 1 agricultural review issued by the United States Department of Agriculture.

The combined exchange value of 16 leading farm products for nonagricultural commodities on August 1 was 83 as an index number as compared with the 1913 base of 100. This is the highest point reached in 47 months, and is the result of the recent rise in grain prices coincident with a fall in prices of nonagricultural products.

Interest in agricultural commodities is now beginning to center on corn and hogs. Despite increased corn acreage this year, weather conditions have cut the prospective crop considerably under 1923 production, and the department points out that should there be an early frost a serious shortage of corn will result. A short corn crop means high corn prices, and inasmuch as approximately 85 per cent of the corn crop is fed to livestock, mainly to hogs, high cost of hog production will result.

The swine industry is said to be well along in its periodic liquidation, with prices beginning to rise, and any further liquidation of breeding stock because of expensive corn is expected to send hog prices to materially higher points during the coming year.

Cotton looks like the biggest crop with the biggest income in five years. Potatoes and fruit are reported on the way to good crops and apparently fairly good prices. There is plenty of hay, and oats are turning out a splendid yield practically everywhere.

Land is now being fitted for sowing of fall wheat with some sentiment reported in favor of a larger acreage than last year. The advance which has occurred in prices of wheat has been the result of an unusual combination of weather conditions, having been exceedingly favorable to the United States and unfavorable in other wheat-producing countries.

erties in bankruptcy or foreclosure proceedings or otherwise, or retained them only through the leniency of their creditors."

Crossbred and high-grade stock make excellent feeders, owing to the good breeding of the purebred stock back of them.

YUMA MESA GRAPES SHOW GREAT PROMISE

The accompanying illustration shows several bunches of Thompson seedless grapes grown at the Arizona experimental



Thompson seedless grapes grown on Colonel Fly's "beloved Yuma Mesa"

farm, Yuma Mesa, from 2-year-old vines. The photograph was taken by the Yuma Chamber of Commerce.

These grapes this year showed the required sugar content for shipment, 18 per cent, about three weeks earlier than the same variety of grapes in the valley.

WINTER LAMB FEEDING BRINGS GOOD RETURNS

Scott Brothers, water users in the California Mesa section of the Uncompahgre project, Colorado, bought two

cars of lambs during the fall of 1923 for winter feeding.

The lambs were run on beet-top pastures as the principal feed, but had corn fodder and alfalfa pasture available. The extent of grazing ground was regulated each day so as not to permit any of

CROP ROTATION AND LIVESTOCK AID LAND

A rotation which is growing in favor includes sweet clover, sugar beets, and grain. The clover is plowed under deep just as freezing weather comes in the fall, after it has been pastured by livestock during the second year of its growth. Clover is followed by beets, and beets by grain with which clover is seeded. This plan secures a heavy carrying capacity as pasture and promotes good yields of beets and grain. The fertilization is a combination of nitrogen fixation, green manuring, and animal manuring. While being pastured the storing of nitrogen by the clover roots goes on and the developed roots when plowed under together with the foliage not eaten furnish a large quantity of humus. It is said that not less than one-third of the weight of the plant is in the roots. The land is used to produce good crops each year and at the same time a considerable part of the elements needed by farm crops is returned to the soil.

One-third of the total number of acres given to the rotation is plowed each year, the cultivation given to the beets answering for one plowing. Livestock attend to the harvesting and also distribute manure on one-third of the total area each year. The beet tops supply a valuable food after the pasturing season is over. Usually the most economical way to build up and maintain production is to use livestock in connection with a rotation adapted to the end in view.

the beet tops to be wasted. Toward the end of the feeding period the lambs were topped off with a little alfalfa hay and a little corn.

On shipping it was found that the average gain amounted to 21 pounds.

The financial results were as follows:

Gross return, 48,000 pounds,	
at 15 cents.....	\$7, 200. 00
Cost, 35,400 pounds,	
at 11½ cents.....	\$4, 159. 50
Freight, pasture bills,	
labor, and all other	
expenses.....	1, 445. 00
Total.....	5, 604. 50
Net profit.....	1, 595. 50

It will be noted that the large profit obtained was due to the increased market price, but an analysis of the results shows that if the selling price had been the same as the cost price there would have been apparently a small profit, but a good return would have been obtained on account of the hay fed and pastures consumed.

ADMINISTRATIVE ORGANIZATION FOR THE BUREAU OF RECLAMATION

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John H. Edwards, Solicitor for the Interior Department; E. K. Burlew, Administrative Assistant to the Secretary; J. H. McNeely, Assistant to the Secretary.
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Elwood Mead, Commissioner, Bureau of Reclamation

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J. B. Beadle Chief Clerk

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H. L. Holgate, Chief Field Counsel
R. M. Patrick, Armand Offutt, and F. J. Bergin, District Counsel
W. F. Kubach, Auditor
W. A. Meyer, Fiscal Inspector

Project	Office	Superintendent	Chief clerk	Fiscal agent	District counsel	
					Name	Office
Belle Fourche.....	Newell, S. Dak.....	F. C. Youngblutt.....	R. C. Walber.....		Brooks Fullerton.....	Mitchell, Nebr.
Boise.....	Boise, Idaho.....	J. B. Bond.....	E. R. Mills.....	C. F. Weinkauf.....	B. E. Stoutemyer.....	Boise, Idaho.
Carlsbad.....	Carlsbad, N. Mex.....	L. E. Foster.....	V. L. Minter.....	V. L. Minter.....		
Grand Valley.....	Grand Junction, Colo.....	S. O. Harper.....	W. J. Chiesman.....	C. E. Brodie.....	J. R. Alexander.....	Montrose, Colo.
Huntley.....	Ballantine, Mont.....	A. R. McGinness.....	J. P. Siebeneicher.....	Miss M. O. Simek.....	E. E. Roddis.....	Helena, Mont.
King Hill.....	King Hill, Idaho.....	G. H. Harris.....	E. V. Hillius.....	E. V. Hillius.....	B. E. Stoutemyer.....	Boise, Idaho.
Klamath.....	Klamath Falls, Oreg.....	H. D. Newell.....	N. G. Wheeler.....	G. R. Barnhart.....		
Lower Yellowstone.....	Savage, Mont.....	H. A. Parker.....	E. R. Scheppelmann.....		E. E. Roddis.....	Helena, Mont.
Milk River.....	Malta, Mont.....	G. E. Stratton.....	E. E. Chabot.....	G. S. Moore.....	do.....	Do.
Minidoka.....	Burley, Idaho.....	E. B. Darlington.....	E. C. Diehl.....	Miss A. J. Larson.....	B. E. Stoutemyer.....	Boise, Idaho.
Newlands.....	Fallon, Nev.....	J. F. Richardson.....	G. B. Snow.....	Miss E. M. Simmonds.....	P. W. Dent.....	Berkeley, Calif.
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Yuma.....	Yuma, Ariz.....	P. J. Preston.....	C. A. Denman.....	E. M. Philebaum.....	P. W. Dent.....	Berkeley, Calif.

Large Construction Works

Minidoka, American Falls	American Falls, Idaho.	F. A. Banks ³	H. N. Bickel.....	O. L. Adamson.....	B. E. Stoutemyer.....	Boise, Idaho.
Umatilla, McKay Dam.	McKay Dam, Oreg.....	R. M. Conner ⁴	C. B. Funk.....	W. S. Gillogly.....		
Yakima, Tilton Dam.	Rimrock, Wash.....	Walter Ward ³	V. G. Evans.....	C. F. Williams.....		

¹ Project operated by Salt River Valley Water Users' Association.

² General Superintendent and Chief Engineer.
³ Construction Engineer

⁴ Superintendent of Construction.

The NEW RECLAMATION ERA is issued every month by the Bureau of Reclamation of the Department of the Interior, Washington, D. C. It is printed by the Government Printing Office, Washington, D. C.

The NEW RECLAMATION ERA is sent regularly to all water users on the reclamation projects under the jurisdiction of the bureau who wish to receive the magazine. To other than water users the subscription price is 75 cents per year, payable in advance. Subscriptions should be sent to the Chief Clerk, Bureau of Reclamation, Washington, D. C., and remittance in the form of postal money order or New York draft should be made payable to the Chief Disbursing Clerk, Department of the Interior. Postage stamps are not acceptable in payment of subscription.

“IN the old pioneer days a farmer without capital might take raw land and make a living, but today the problem is more intricate. There is no more free public land such as will yield a crop from its first year of cultivation. Development of privately owned land by public moneys presents a different problem from putting such development on Government-owned land. Speculation has been rife in the land included in districts to be irrigated. Such speculation must be checked to permit fair opportunity to settlers.”

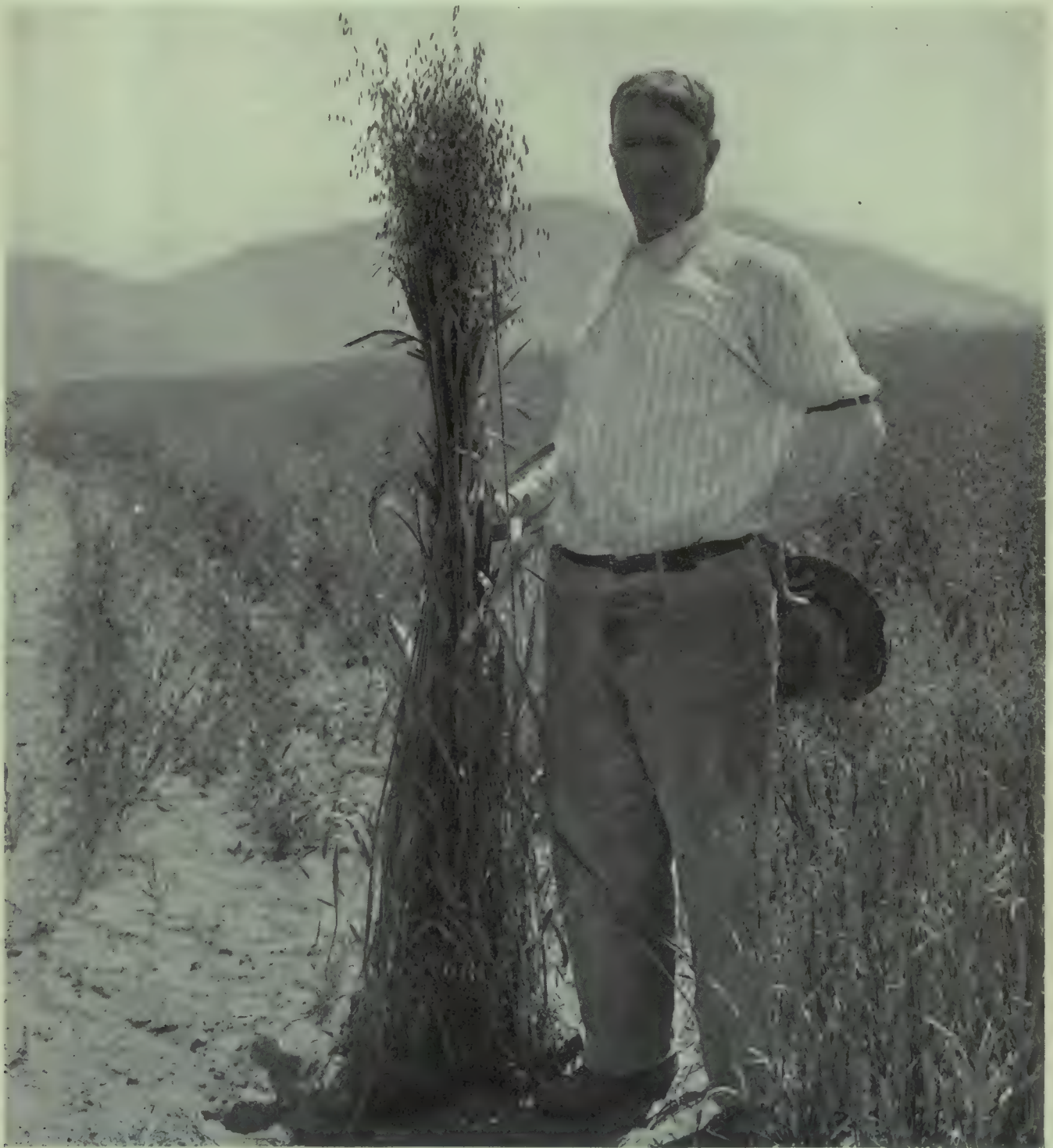
*ELWOOD MEAD,
Commissioner, Bureau of Reclamation.*

NEW RECLAMATION ERA

VOL. 15

NOVEMBER, 1924

NO. 11



OATS MORE THAN 6 FEET TALL GROWN ON THE KLAMATH PROJECT, OREGON-CALIFORNIA

IRRIGATION is the art whereby the deficiency in the natural rainfall, whether large or small, is supplied by water, artificially added, so that regular, abundant crops may be obtained.

Irrigation is and always should be supplementary to the rainfall. Consequently, the first big irrigation problem is to conserve the rainfall in the soil for crop use, so that the available irrigation water may be made to cover as much ground as possible. The beginning of irrigation wisdom is the conservation of the natural precipitation for the use of crops.

From "PRINCIPLES OF IRRIGATION PRACTICE,"

*By Dr. John A. Widtsoe, Member of the
Committee of Special Advisers on Reclamation.*

NEW RECLAMATION ERA

Issued monthly by the Bureau of Reclamation, Department of the Interior, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

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PRESIDENT COOLIDGE BACKS IRRIGATION DEVELOPMENT

In letter to American Mining Congress the President states that it is his purpose unremittingly to stimulate and encourage the development of these great projects by every authority of the Federal Government

THE following extracts are from a letter of September 17, 1924, from President Coolidge to Herbert Wilson Smith, division of research, American Mining Congress, Washington, D. C., read at the annual convention of the congress at Sacramento, Calif., September 29, 1924:

"There are certain fundamental contributions to the rehabilitation of our western mining industries through reducing inherent costs of operation. They lie in the further development of our great water powers and in the cheapening in costs of living in those regions by the local production of foodstuffs and supplies. Indeed, the development of water power, reclamation, and the rehabilitation and expansion of our metal industry are thus definitely related. No greater contribution can be made to the mining industry by the Government than the development of these parallel contributions. Under the Federal water-power act by which leases are granted for periods of 50 years for the development of water power, and under the reclamation act by which the Government contracts water storage and its distribution, we have established policies of stimulation of such development. Generally the full utilization of the great water supplies of the West will bring helpful aid to the whole of the other industries in that great country.

"Those places in the West where our water resources, either in power or irrigation, are easily and readily accomplished have now in the main been exhausted and to secure the greater development we have need to consider the larger projects of more difficult and expensive engineering character. These problems comprise questions of storage of water on a vast scale, so as to cover the annual as well as the seasonal fluctuations in stream flow, and thus to provide not only immediate supplies but protection against dry years. They involve questions of flood control, questions of power de-

velopment and supply to the mines and other industries, questions of irrigation and reclamation.

"An important problem of this character lies at the door of your Congress in the properly considered storage, flood control, irrigation, reclamation, and prevention of salt water encroachment in the Sacramento River Valley. Another great problem of this character lies in the Colorado River, where, as a preliminary to large engineering development, the administration has endeavored to secure a settlement of the conflict of interstate rights which have so long retarded the expansion of this locality by a treaty amongst the seven States that are concerned. Six States have ratified this treaty and it is hoped that the seventh will in due time give adherence. Similar possibilities of storage of water and development of power are presented to us in the Columbia River, and many proj-

ects of less dimensions but of great importance to the future of our country lie scattered over the entire intermountain region.

"Some minor criticism has been made as to the policy of our unremitting development of these projects by those who have thought we were already over-producing in agricultural products. They feel that these projects should be stayed until agricultural production has readjusted itself. These criticisms lie in the lack of understanding that these projects take many years for development, that they furnish but a small portion of the total increased food supply required even by our increase in population, that the utilization of their supplies lies in the development of the West itself. It is my purpose to unremittingly stimulate and encourage the development of these great projects by every authority of the Federal Government.

"We have every reason, in shaping those national policies which will affect this great section of the country, to keep our thoughts upon the future. A country growing so fast in population as is our own can not limit its considerations to immediate necessities. Many people now living will see this a country of 200,000,000 inhabitants. The national interest will be served by promoting the widest diffusion of population. The national security, the best social development, the wisest utilization of natural resources—all demand this.

"When all is said and done, the development of our great resources must in a large sense rest upon the courage and energy of our individual citizens. Ours is not a country of paternalism. It is a country where the Government finds its best service in giving support in the solution of those larger problems which are incapable of individual solution, in maintaining the initiative of our citizens in the rightful application of their talents and industry."

R. F. WALTER MADE ACT'G CHIEF ENGINEER

R. F. Walter, assistant chief engineer, has been designated as acting chief engineer of the Bureau of Reclamation, to fill the vacancy caused by the recent resignation of F. E. Weymouth. He will begin the performance of his new duties on November 1, 1924, and will be located in the Denver office of the bureau.

The new acting chief engineer has been connected with the Reclamation Service since 1903, serving in various capacities as engineer, supervising engineer, assistant chief of construction, and assistant chief engineer.

Mr. Walter was born in Chicago, is a graduate of the Colorado Agricultural College and took a post-graduate course in civil engineering.

AGRICULTURAL AND ECONOMIC PHASES OF BAKER PROJECT

Based on exhaustive review of previous reports and field investigations by committee of experts, and having in mind provisions of proposed reclamation act, Oregon project is pronounced feasible

INTRODUCTION

THE investigations made were carried out in accordance with arrangements made by the Division of Farm Economics of the Bureau of Reclamation. A committee was selected to review reports heretofore made on the Baker project Oregon, and to submit to the bureau its conclusions, after reviewing the written reports and carefully examining the proposed project.

The committee selected consisted of George R. Hyslop, agronomist, Oregon Experiment Station, Corvallis, Oreg.; M. H. Lapham, associate soil technologist, Bureau of Soils, United States Department of Agriculture, Berkeley, Calif.; George C. Imrie, assistant engineer, Bureau of Reclamation, Umatilla project, Hermiston, Oreg.; and George C. Kreutzer, Director of Farm Economics, Bureau of Reclamation, Denver, Colo.

An agricultural and economic report was made on the Baker project in November, 1923, by members of the staff of the United States Department of Agriculture. At that time the repayment of construction of reclamation projects was based on the reclamation act of 1914, which provided that construction costs would be repaid in an initial payment of 5 per cent and 15 annual payments, commencing with the fifth year, whereof the first five payments shall be 5 per cent of the cost and the last 10 payments 7 per cent of the cost.

Instructions were received by the committee to review the above-mentioned report and other reports which referred to the project and make such field investigations and finally summarize its findings, having in mind the applicable provisions of the bill H. R. 9611, already passed by the House of Representatives and pending in the Senate.

CONCLUSIONS

(1) The predominating soils of the project occupy upland terraces, slopes, and rolling to hilly areas. They are of smooth and gently sloping to steep topography and are rather generally underlain by hardpan, bedrock, or other impervious materials which frequently occur at shallow depth. Less extensive areas of alluvial soils of deep permeable character occupy the stream bottoms and river flood plains.

The soils of the uplands are of favorable texture, regionally well drained, and of moderate productivity under irrigation. Their utilization and relative re-

turns will be determined mainly by depth of the soil material, which is variable.

The soils of the stream bottoms are intrinsically highly productive under favorable conditions of drainage and absence of injurious accumulations of alkali. Their utilization and returns will be determined mainly by the extent to which they can be protected by drainage from seepage waters from the higher lying lands.

There appears to be no lack of mineral plant food requirements in the soils of the project and no serious depletion of fertility under the type of farming suitable to the project is anticipated.

(2) A classification of the lands of the project, based upon topography and adaptability to irrigation and including such modifications of the classifications of the 1923 report as appear feasible from the standpoint of the present review of the earlier data, indicates as follows:

(a) There are 6,305 acres of first-class irrigable lands of smooth surface, gentle slope, and rather shallow depth but otherwise well suited to irrigation.

(b) There are about 5,600 acres of second-class irrigable land of somewhat pronounced slope or irregular surface, well suited to irrigation but requiring a somewhat more expensive system of distribution and experience in irrigation.

(c) There are about 12,600 acres of third class irrigable lands of steep slope, irregular topography, or of more or less shallow or stony character demanding care in preparation of land for irrigation and patience, skill, and experience on the part of the settler. The steeper and more shallow areas can best be utilized, at least in part, for irrigated pasture and meadow, but field crops can be grown successfully where depth of soil is sufficient.

(d) There are 4,340 acres of river bottom lands of poorly developed drainage, the most of which have been eliminated from the project in previous engineering reports owing to adverse conditions of drainage and alkali accumulation.

(e) There are 2,428 acres of alluvial lands occupying bottoms of local drainage ways and areas in the river bottoms now mainly well drained and free from alkali. These were excluded from the project in the 1923 classification on the basis of impaired drainage under conditions of future irrigation of the adjacent uplands and danger of accumulation of seepage waters and alkali. It is recommended that these be returned to the

irrigable area of the project, drainage of such lands to be provided where necessary by the Bureau of Reclamation and the cost charged to the project.

(f) Of a total of 11,245 acres regarded in the classification of 1923 as best excluded from the project owing to steep slopes, irregularity, or shallow depth, about 30 per cent, or approximately 3,500 acres, is returned to the project under designation of third-class irrigable land. Much of this can best be utilized as pasture and meadow.

(3) A duty of water of 2.5 acre-feet at the farm is deemed sufficient.

(4) The area of irrigable land in the project is estimated to be 26,931 acres, of which 23,771 acres shall carry a full water right and 3,160 acres shall carry a partial water right.

(5) The available reservoir capacity is 95,000 acre-feet with the crest of dam at elevation 3,205.

(6) Dam site No. 1 is adopted.

(7) Change of irrigable acreage and canal capacities and reduced prices of labor and material, especially the proximity of the new cement plant, make it advisable to have the engineering estimates revised.

(8) The cost per acre of storage on lands having a partial water supply based on the 1923 engineering estimate is \$50.78 per acre to which \$3 per acre should be added for drainage. (These figures are subject to change when revised engineering estimate is made.)

(9) Since about 45 per cent of the land is public land a minimum operation and maintenance charge on such public land will be necessary, repayment to be made if sold within three years, but if sold later a portion of accrued charges shall be added to construction. After five years the operation and maintenance charges on all public lands remaining unsold shall be paid by the district.

(10) Lands seeped or having accumulations of alkali to the extent of 4,340 acres have been previously eliminated from the project at the request of the owners. These lands will require drainage and might well be included within the project.

(11) Climatic, soil, topographic, and market conditions, as well as probable personal, require production of valuable and concentrated products.

(12) Livestock and seed farming seem most likely to succeed.

(13) The type of farming as well as soil, topographic features, and amount of capital make a 60 to 80-acre unit most practicable.

(14) Crop standardization on a few semihardy to hardy crops of the best varieties will promote higher yields and simpler marketing.

(15) Recommended crops sold on a normal cash market may be expected to make an average cash return of \$30 an acre.

(16) It is believed that with good stock utilizing most of the grain and forage and with good crop management, a per acre yield of \$37.50 per year may be made.

(17) Preparation of land for irrigation will be inexpensive.

(18) The project will require approximately 250 new settlers.

(19) Careful selection of settlers based on their experience, industry, and capital is recommended.

(20) The cost of improving raw land to the point of production will be from \$5,000 to \$7,000 per farm.

(21) Settlers with capital are scarce, and it is recommended that long-time credit be extended to them in order to settle the project rapidly and successfully.

(22) A competent agriculturist should assist the settlers in solving their social and economic problems.

(23) Ample short-time credit is available locally for operating.

(24) Taxes are reasonably low and should not increase under development to more than \$1.25 per acre.

(25) The value of raw land, depending upon its quality and topography varies from \$2.50 to \$5 per acre.

(26) The committee concludes that on the basis of the above recommendations and of the proposed reclamation act providing for the repayment of construction charges at the rate of 5 per cent of the gross annual returns, the project is feasible.

SOIL CLASSIFICATION

The soils of the project are represented by a number of soil types as classified in the soil and economic survey of 1923. These vary in origin, depth, character of subsoil and other underlying materials, topography, and drainage and in agricultural importance. The greater areas of these occupy elevated benches and slopes on either side of the river; others are confined to the lower benches of the river valley; and others occupy the stream bottoms.

The predominating soils of the uplands are derived from old lake laid and stream laid deposits. They occupy smooth and gently to moderately sloping flats with marginal gentle to steep slopes where entrenched by stream valleys and drainage courses.

They are characterized by compacted and heavy subsoils or by cemented hard-

pan substrata. Hardpan areas are most pronounced upon the more elevated flats and the upper slopes or rim marginal to these. Surface drainage is well developed but subdrainage is impaired by imperious subsoil conditions. Texture of these soils is generally favorable to cultivation. Their water-holding capacity and relation to irrigation and agriculture will depend mainly upon depth to hard pan, which varies from but a few inches to several feet.

Associated with these are two types of soils derived mainly by weathering in place of underlying consolidated rocks. They are inextensive, frequently shallow, and sometimes stony; the more shallow arable areas can be utilized for pasture and shallow rooted crops; the deeper areas are of good water-holding capacity and are suited to general farming purposes.

The soils of the lower benches are of smooth, gently sloping topography and favorable to economical distribution of water and irrigation practice. They are irregularly underlain by hardpan but this is frequently thin and is of greater average depth than in the soils of the more elevated terraces. They are of favorable texture and constitute the greater part of the alfalfa and other farm lands at the present time.

The soils of the stream bottoms consist of recent alluvial deposits. They constitute the lower bottoms of Powder River and the valley or bottom lands of local draws and minor streams tributary to the river from either side. The river bottom soils have for the most part been excluded from the project in the preceding engineering reports owing to unfavorable drainage and alkali conditions. The soils of the tributary stream and local drainage courses are deep, friable, and will be admirably suited to agriculture under favorable conditions of drainage.

In general the soils of the project not already excluded from consideration are well drained and free from injurious accumulations of alkali at the present time. Provision will need to be made for future protection of the lower lying lands by drainage and the productive capacity of the lands will be determined largely by depth of soil which is extremely variable. Depth of soil will constitute a fundamental basis in determination of size and boundaries of farm land units and in the final delineation of areas of unsuitable lands to be excluded from the project.

There is no evidence that any of the soils of the project are deficient in necessary plant food elements or materials, unless it be in organic matter, which can be supplied and maintained under the

type of agriculture which will necessarily prevail.

LAND CLASSIFICATION

In the report of 1923 the lands of the project were classified into six grades or classes. The basis of classification is mainly irrespective of soil boundaries and based upon topography as determining conditions of drainage and the relative ease or difficulty anticipated in distribution and application of water.

Such classification was based upon the provisions of the old reclamation act, in which costs were assessed equally to the lands of the project and having in mind the probable degree of experience, skill, and industry of the settler upon reclamation projects. In reviewing the report of 1923 results of such previous classification are considered from the standpoint of proposed legislation and modification which such changes in the reclamation laws or policy as regards provision for drainage and control of settlement may dictate.

The various lands as designated in the 1923 report are as follows:

Class A: Irrigable lands, first class.—This includes lands of smooth surface, gently to moderately sloping, and well adapted to irrigation. The total area, as given in the 1923 report, after deduction of 6 per cent for right of way, is 6,305 acres. No further additions or eliminations recommended. Nearly all of this class of land is underlain by hardpan at variable depth. The topography, however, is favorable, little leveling will be required, and handling of water will be relatively easy and without great danger of gulying or erosion.

Class B: Irrigable lands, second class.—Lands of this class occupy somewhat more steeply sloping or irregular areas. Leveling will be necessary to some extent but should not be costly. There will be some danger of gulying and somewhat greater experience and care will be necessary, but the lands can be successfully irrigated by one experienced in irrigation practice without great difficulty. Settlers having some experience in irrigation of slopes should be preferred. The total area, less 6 per cent for right of way, is 5,624 acres. No changes recommended.

Class C: Irrigable lands, third class.—Lands of this class occupy steep slopes and areas of irregular topography. Distribution of water will require care and skill upon the part of the settler to irrigate successfully and prevent injury from gulying, particularly during the early period of farm development. Careful selection

(Continued on page 168)

PROJECT LANDS CLASSIFIED INTO SIX GRADES

Results of 1923 classification considered from standpoint of proposed legislation and modifications dictated by policy concerning drainage and settlement

(Continued from page 167)

of the settlers with some means of supervision will be advisable. Much of this class of land will include small ridges and spots having shallow hardpan which will decrease returns. A large proportion of the class C lands can probably best be utilized for pasture and meadow. The total area of this class of lands as given in the 1923 report is 9,106 acres. To this class of lands it is recommended that a portion of the lands included in class R, nonirrigable areas, be added which will bring the area of class C lands up to a total of about 12,500 acres.

Class D: Lands, river bottoms, poorly drained.—Of this class of lands 3,500 acres have been eliminated from the project in the reclamation reports. In the land classification of 1923 a total of 4,340 acres of this class of land is recognized, making an addition to the area excluded from the project of 840 acres. It is recommended that this elimination stand as in the 1923 report, unless provision for adequate drainage is made.

Class E: Lands, local bottoms, impaired drainage.—The lands included in this class occupy local stream bottoms and adjacent slopes. The soils are deep, friable, easily cultivated and irrigated, and apparently should be highly productive. At the present time only a few small areas are unfavorably affected by seepage or accumulations of alkali. Under extensive irrigation of the adjacent upland terraces, however, these areas will be more or less subject to accumulation of seepage waters and alkali salts. This condition will be aggravated by rapid drainage of the adjacent uplands and by occurrence of impervious hardpan or other materials in the upland soils, which will give rise to zones of seepage along the hill slopes. In the 1923 report the area of this class of lands amounted to 2,583 acres, which was excluded from the project, since it was felt that eventually the entire area would be in need of drainage, the cost and feasibility of which had not at that time been considered. Most of these areas have good natural fall, many of them are traversed by intermittent stream channels of good depth, and it is believed the area of this class of lands can and should be included within the project, provision to be made for drainage as needed and added to the cost of the project. It is estimated that drainage of these lands can be provided for at a project cost of \$3 or less per acre. The area of the lands to be added to the irrigable area of the project after deduction of right of way is 2,428 acres.

Class R: Nonirrigable lands.—In the classification of 1923 a total of 11,245 acres was excluded from the project mainly on the basis of steepness of slopes and of shallow or stony soils. To this were added smaller areas indicated in the engineering reports as lying above the reach of gravity water.

The area included in this class of land provisionally excluded from the project in the 1923 report shows an increase of 4,901 acres over that previously excluded from the project in the engineering reports.

It is believed that if effective control can be exercised by the Bureau of Reclamation or otherwise in selection and supervision of experienced settlers, with care and skill in preparation and irrigation of the land, a considerable proportion of the lands of this class can be utilized for pasture and meadow, supplemental to farming of adjacent lands of more favorable topography.

The exact amount of land of this class which can be so utilized can not be accurately determined at this time, but it is believed that about 32 per cent of the total lands of this class, or 3,468 acres, could be included within the irrigable lands of the project for such purposes. In other words, this area of class R will be added to the lands of class C, leaving in the area of nonirrigable lands to be excluded from the project a total of 7,777 acres, or an increase of 1,433 acres over that given in the engineering report.

Areas of the various classes of lands as given in the 1923 report and as modified by recommendations included in the present review of previous reports are given in the accompanying table.

Areas of various classes of land

Class of land	Report, 1923	Re-view, 1924	Additions or deductions made, 1924
	Acres	Acres	
A, first class, irrigable.....	6,305	6,305	
B, second class, irrigable.....	5,624	5,624	
C, third class, irrigable.....	9,106	12,574	+3,468
D, fourth class, irrigable, poorly drained river bottoms.....	4,340	4,340	
E, local bottoms.....	2,428	2,428	(¹)
R, nonirrigable.....	11,245	7,777	-3,468

¹ To be included in irrigable area.

WATER SUPPLY AND PROJECT COST

(1) The duty of water is taken as 2.5 acre feet at the land and 3.6 acre feet at point of diversion.

(2) The net area of the project is about 26,931 acres, of which 23,771 acres require a full water supply and 3,160 acres require a partial water supply.

(3) An available reservoir capacity of 91,250 acre-feet is required.

(4) As in the Munn-Savage-Fisher report of January, 1923, dam site No. 1 is adopted. The normal water surface elevation of 3,203 (113 feet above low-water surface) is required to give this capacity of reservoir. The flood water surface will be held at this same elevation by means of a movable crest on spillway. The variable radius arch type of dam is adopted.

(5) The percentage of monthly duty given in paragraph 68 of the C. C. Fisher report of April, 1922, is adopted.

(6) The capacity of the main canal will be 380 second-feet to deliver water to 23,771 acres and the canal will follow the same line and grade and be of a similar type of construction as proposed in the C. C. Fisher report of April, 1922.

(7) As the net area is approximately equally divided under the north and south canals, each of these canals is designed with an initial capacity of 190 second-feet. The length of the canals will be as in the Munn-Savage-Fisher report of January, 1923.

(8) The lateral system is to be designed so as to reach each farm unit, the farm units to be of variable acreage and to be laid out to conform to topography rather than to conform to the land lines.

The estimated cost of the project taken from the Munn-Savage-Fisher report is as follows:

Examinations and surveys.....	\$80,000
(including Admiralty surveys)	
Storage.....	1,332,600
Main canal.....	1,011,990
North canal.....	\$550,900
South canal.....	665,280
Lateral system.....	1,216,180
Grand total.....	4,140,770

It is believed that the height of the dam should remain as in the previous report, but that the size of the main, north, and south canals should be reduced to conform to the required capacity. Lateral system should be the same as in the previous report.

Since the last engineering report was submitted it is understood that the Oregon-Washington Railway & Navigation Co. has agreed to pay one-half of the construction cost of moving the railroad out of the proposed reservoir site. From the previous report this will reduce the total storage cost by \$210,000, leaving a

balance of \$3,930,770 to be charged to the new and old lands.

As in previous reports the cost of examinations and surveys and storage charge will be prorated to all lands on an acreage basis.

Examinations and surveys.....	\$80, 000
Storage (less one-half cost of railroad relocation).....	1, 112, 600

Total.....	1, 192, 600
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This is to be carried by 26,931 acres, or \$50.78 per acre for storage.

As 3,160 acres of old lands want storage water only, they will pay \$160,465, leaving a balance of \$3,770,305 to be paid by the new lands or \$158.61 per acre.

DRAINAGE

In the engineering report of C. C. Fisher, April, 1922, a charge of \$8 per acre for drainage of old lands was included in the charge to the old lands, but in the Munn-Savage-Fisher report of January, 1923, this charge for drainage was cut out, as the land to be benefited by the drainage was eliminated from the project.

In the lands now included in the project those designated as E lands in the soil report of 1923 and described as lands lying in the local bottoms and having impaired drainage should be provided with drainage. These E lands are approximately level transversely of the draw, with moderate slope toward the river and having a deep, narrow waterway cut through their entire length. On both sides of the draw the land rises on steeper slopes to an upland bench of irrigable land, the side slopes of the larger draws are irrigable land, but generally the side slopes of the smaller draws are not included in the irrigable land of the project. The upland benches above these E lands have an underlying stratum of hard pan at varying depth, which is generally exposed on the side slopes of the draw and any excess water applied to the upland benches would come to the surface on the side slopes of the draw. This water should be collected in drains located at the break in the floor of the draw and carried in cross drains to the deep-water course, which is already washed out through the E lands.

To provide for this necessary drainage it is estimated that an additional project charge of \$3 per acre should be added to the above charge of \$158.61 for new lands, bringing the charge to the new lands to \$161.61.

Because of the change in the size of the main, north, and south canals the engi-

neering estimates should be revised. This would lower the cost per acre to the new lands. It is also noted that in figuring the unit cost of cement a freight charge from Tolenas, Calif., to North Powder was added. Since the estimates were made, a cement manufacturing plant has been opened up at Lime, Oreg., 55 miles south of North Powder, on the Oregon-Washington Railroad & Navigation main line. The saving in freight charge between these two points for the amount of cement to be used in the construction work would amount to an appreciable saving in construction charges. Doubtless other savings can be made, as cost of both labor and materials is now lower than at the time the estimates were made.

During the period when the project is being settled, say for the first five years after the project is constructed, a minimum charge of \$1 for operation and maintenance should be assessed against the public lands not settled at the time the operation and maintenance charge is assessed for the current year. If the land is settled within a period of three years, this additional operation and maintenance charge should be paid for by the settler upon taking up the unit. However, if the land is not settled in the period of five years, a portion of the accrued operation and maintenance charges should be paid by the settler when he takes up the unit, the balance to be added to the construction charges on the project as a whole. After the five-year period, all of the operation and maintenance charges for the entire project should be carried by the district.

For the purposes of this report 4,340 acres of lands shown on the soil map as class D, being classed as seeped and alkali lands, have, at the request of the owners, been eliminated from the project. It is contended by some whose lands are included within the project that these lands will be benefited by waste water from the project and therefore should be included. In view of the fact that these lands are included in the district, the district has the right under the State law to assess charges against such lands in accordance with any benefits received. Reservoir capacity as contemplated with the crest elevation at 3,205 gives sufficient water to provide 1 acre-foot for each acre of most of these lands.

It is the opinion of this committee that the best interests of this area can be served if it is included in the project in order that adequate drainage may be provided to protect these lands. It

seems certain that the irrigation of the higher levels will increase the alkali problems unless proper drainage is provided.

TYPE OF AGRICULTURE

The agriculture of Baker County consists principally of hay and pasture production supplemented by range production of cattle and sheep. Dairying is a coming industry, but the dairy animals thus far number only 9,700 as compared with 48,000 beef cattle and 102,000 sheep. The number of hogs is limited, there being only 6,800 on December 1, 1923.

Experienced livestock men of Baker County state that the range adjacent to the project is not all utilized by local stockmen and that a good many sheep and some cattle are brought in from other counties to make use of it. This in their judgment justifies a larger hay and forage production.

The county has shipped out some hay, principally timothy and clover and also some alfalfa, but on account of alfalfa weevil this probably will not take place much longer until the entire State becomes infested with that pest.

The development of the project will bring on a conservative basis about 30,000 tons of alfalfa and clover hay and if the tendency of the country is followed the production will be still larger, as the custom is to grow a high percentage of the acreage in hay with little grain, seed, or other crops; 30,000 tons of hay will mean an increase over the present hay production of about 16 to 20 per cent. Too rapid an extension of the forage without a proper balance of livestock to consume it will make alfalfa a very poor cash crop.

The type of agriculture for the project will be determined in part by where the settlers come from, by the custom of the farmers now in Baker County, and by soil and marketing conditions of the new project.

The conditions surrounding the project are such that a rather diversified agriculture seems most likely to succeed. Grain or hay farming for shipment is out of the question because of the distance and competing territory.

Commercial fruit production, because of frost, soil depth, and long haul, has been omitted from consideration. Undoubtedly many home plantings will be made on favored sites.

Considerable areas of steep and in some cases shallow land suited only to hay and pasture, as well as distance to

(Continued on page 170)

SIZE OF FARMS AND KINDS OF CROPS CONSIDERED

For a settler with reasonable capital, 60 to 80 acres should prove the most practicable unit—Hay, grain, seed crops, and potatoes offer favorable possibilities

(Continued from page 169)

market, require that a large part of the income be derived from the sale of live-stock and livestock products.

Some of the larger, better financed, and more experienced range stock operators on the farms having a high percentage of alfalfa land may develop a system of raising a high percentage of hay and using it in connection with beef cattle or sheep run on the range during the summer.

The distance of 15 to 25 miles from the project to market makes necessary the specialization on more concentrated and valuable products.

From the standpoint of the newcomer with limited capital, as well as the topography of the average farm unit, it seems that he is most likely to be successful on a diversified farm of moderate size with dairying, hogs or sheep, and poultry, with a cash crop of seed or some other specialty.

Since there is little dry farm land adjacent producing grain, the diversified farm layout must include an area suited to that crop, as the diversified farmer must produce his entire feed supply. The new settler has his best opportunity to pay out as he develops his place if he operates on a diversified basis and practices a good crop rotation on his farm land.

SIZE OF FARM

Farm size will vary according to the depth and character of soil, topography, cost of getting water to the land, and probably most of all with the ability of the settler.

The exceedingly small farm is rendered impracticable for the most part because of soil character, distance to market, and crop limitations on account of frost.

Large holdings except for established operators with good range and livestock connections, are impracticable because of capital required, difficulty of handling such large acreages in a limited number of crops, and the difficulty of watering much steep land under irrigation.

Based on a family basis it seems that the most practicable unit is one of 60 to 80 acres for the new settler with reasonable capital.

CROPS TO BE GROWN

Experience in the community supplemented by observations and experiment station work under similar conditions indicate that the best forage crop for the reasonably deep soil is Grimm alfalfa.

On shallower and especially on soils a little too wet, the clovers, such as red and alsike, are best.

There will be little land now included in the project that is likely to get so wet as to require red top and alsike clover.

As an annual forage crop for hay or silage, field peas and oats or barley are likely to be very successful but can not compete with clover or alfalfa for hay.

Profitable grain crops will be confined largely to barley, wheat, and oats. Hannchen and Trebi barleys, Federation wheat, and Victory, Golden Rain, and Silvermine oats are highly productive varieties for this section.

The surest silage crops for the section generally are (1) peas and grain, as barley or oats, and (2) sunflowers. In some of the more frost-free localities, corn or corn and sunflowers may be grown. The farm locations are such that the construction of trench silos will be rather easy and this type of silo will largely do away with winter freezing.

The best pasture plants consist of Kentucky blue grass, orchard grass, smooth brome grass, Grimm alfalfa, and white clover, and it is recommended that the following mixture, which includes several shorter lived grasses, be used:

	Pounds
English rye grass.....	4
Timothy.....	3
Meadow fescue.....	2
Orchard grass.....	4
Smooth brome.....	3
Kentucky blue grass.....	3
Grimm alfalfa.....	2
White clover, preferably Ladino.....	1
Total.....	22

With seed that is of very good quality, as little as 15 pounds an acre is sufficient to secure a good stand. On the steep lands it will be safest to sow early in the spring and let freezing and thawing cover the seed or else brush it in lightly with as little disturbance of the surface soil as possible. It will be somewhat difficult to seed plowed land on the steep slopes in the summer and keep it moist enough to germinate the seed and at the same time prevent erosion of the soil.

Owing to the topography and soil depth, pasture must enter largely into the cropping plan. As the pasture and alfalfa meadows must be mainly on the sloping land there will be little opportunity for rotation there. Manuring of the pasture and alfalfa meadows will do much to keep up and increase yields and

it is probable that sulphur application to the alfalfa will help after the first few years.

On the less rolling and steep land the grain, clover, and miscellaneous crops may be grown in a rotation that will save labor, maintain better yields, and keep pests in better control.

Of the special crops for cash sale, probably the most promising is red clover seed, although there is a possibility in alsike and white clover for seed on some places.

Seed peas may in time become a good cash crop.

The large potato-producing territory in Malheur County, Oreg., and south Idaho, needs quantities of good seed potatoes of the Netted Gem and Rural varieties. The new lands of the project, especially those nearest the railroad, can grow some seed potatoes to good advantage.

Other possibilities will develop along special lines.

CROP UTILIZATION AND MARKETING

Most crops must be marketed in the form of livestock and livestock products. Aside from the local demands, the meat animals are usually marketed at coast markets, principally Portland. Some stock is shipped to eastern centers.

Dairy products have an excellent outlet through local manufacturers as well as cream-shipping companies. Poultry products are largely handled locally.

Grain and seed are usually sold through dealers at Baker, although the development of a seed industry will bring in outside buyers.

Very little has been done in the development of marketing organizations. These may become more practicable when more small units develop.

PROBABLE YIELDS AND RETURNS

Based on yields recorded in reports of the United States Department of Agriculture for Baker County, a crop survey of the project by H. K. Dean, and returns from somewhat similar projects, it appears that alfalfa may conservatively be expected to yield an average of 3 tons an acre. Good farmers using Grimm alfalfa and maintaining steady growth and good stands may regularly harvest two to three crops with a total yield of 6 to 7 tons an acre.

Barley, wheat, and oats may be expected under the conditions to yield somewhat similarly in pounds of grain per acre with a probable advantage for barley and wheat. As the grain must be grown on the more level land which is usually deeper, it is thought that 50 bushels of barley, 40 bushels of wheat, and 70 bushels of oats may be averaged with good farming.

If clover or alfalfa are grown for seed, in either case, a clipping may be removed furnishing a ton of hay and there will certainly be produced three-fourths of a ton per acre of straw, making excellent feed for winter maintenance.

Pasture is expected to carry one 1,000-pound animal per acre for 6 months.

Seed yields of either clover or alfalfa are conservatively set at 6 bushels an acre.

Silage crops of peas and oats may be expected to yield 10 tons an acre.

Potatoes with good seed stock and properly handled will average over 200 bushels an acre.

The crop returns from the project will be much more certain if settlers can be standardized on the right varieties at the outset. This will not only mean greater yields but simpler and better markets.

Below is a cropping system recommended for one type of an 80-acre farm with estimated average returns:

Crop distribution and yield, 80-acre dairy and seed farm

Crop	Acres	Unit of yield	Yield	
			Per acre	Total
Pasture.....	20			
Grimm alfalfa.....	15	Ton.....	3	45
Red clover or other seed:				
Seed.....	20	Bushel	6	120
Straw.....	20	Ton.....	$\frac{3}{4}$	15
First growth clipped.....	20	do.....	1	20
Barley.....	16	Bushel	50	800
Wheat.....	5	do.....	40	200
Silage or roots.....	3	Ton.....	10	30
Potatoes or miscellaneous.....	1	Bushel	200	200

With values of \$7 per ton for hay, \$4 per ton for seed straw, \$25 per ton for grain, \$7.20 per bushel for clover seed, \$1 per sack for potatoes, \$5 per ton for silage, and \$200 per year for the pasture of the place, there is a gross annual cash return of \$2,445, or slightly over \$30.50 an acre.

It is believed that by feeding the crops to livestock and poultry and marketing the grain, hay, straw, and pasture in that form there will be a sufficiently greater return to make a gross of \$3,000 at conservative prices, or a per acre return of \$37.50. It is understood that the latter depends upon the ability of the settler to provide himself with or develop good stock for his farm.

Stock for such a farm is estimated to consist of 10 to 12 cows or with young

stock, the equivalent of 15 head, 3 brood sows, averaging 3 litters each in two years, 27 pigs a year; 3 work horses; 200 hens.

With high producing stock and good management the exceptional settler should surpass the above estimates.

IRRIGATION PRACTICE

Outside of clearing, very little expense is incurred to prepare land for irrigation. On the steep slopes the brush is removed and corrugations made down the slope at distances about 30 inches apart. These corrugations are shallow and the most beneficial results are obtained by turning a very small head of water into each channel. If the streams are not well regulated erosion takes place. It is the custom to not disturb the surface of the soil in utilizing steep lands for pasture or meadow. The seed is sown on the surface without plowing and then brushed or harrowed into the land. Alfalfa is sometimes sown without a nurse crop in a similar manner. If a nurse crop is sown the land is plowed and "floated," which operations are inexpensive. Some settlers practice plowing new lands before sowing pasture or meadow, and state that by so doing excellent results are obtained. The bench lands which have gentle slopes will need leveling in some instances, but as a general thing very little soil will be removed. It is not advisable to remove much of the surface from rather thin soils, and since the corrugations follow natural slopes the skilled irrigator obtains satisfactory results with very little leveling.

LAND SETTLEMENT

Previous investigators determined that about 45 per cent of the Baker project was public land and that the remaining lands were held by 61 owners in areas ranging from 40 acres to a few in excess of 1,000 acres. Fifteen farms were from 161 to 320 acres and seven were in excess of 500 acres.

As previously stated, farm units from 60 to 80 acres in area should be found most suitable for the average settler and his family. The public land will make homes for approximately 150 families, and to reduce the size of holdings now held by private owners to units not to exceed 160 acres in area will probably require an additional 100 families. Therefore at least 250 new settlers will have to be obtained to utilize fully the irrigable land on the project.

The surface of the land is more or less broken, and although local farmers seem to have no great difficulty in successfully cultivating and irrigating their farms, still it will require settlers of industry and skill to succeed. Citizenship alone can not determine the success

of a settler. Settlers on this project will have to be carefully selected if a satisfactory percentage are to succeed. They should be sturdy people with some farm experience, who realize that to develop a new farm requires industry and the practice of economy seldom experienced by the city dweller. They must also have some capital. Time, labor, and money are needed to convert raw sagebrush land into producing farms.

Land in the brush is valued at approximately \$2.50 an acre and it is believed that it can be bought at that figure, certainly not higher than \$5 an acre. Assuming that 80 acres could be purchased for \$5 an acre, a fully developed farm would cost the settler approximately as follows:

80 acres at \$5 an acre.....	\$400
House (material only).....	500
Barn (material only).....	350
Chicken and other outhouses.....	150
Fences and corral.....	300
Well, pump, and wind-mill.....	300
Clearing 80 acres at \$5 an acre.....	400
Seed for first year.....	150

EQUIPMENT

Single plow.....	\$25
Wagon.....	150
Mower.....	105
Rake.....	60
Harrow.....	30
Single cultivator.....	10
Disc harrow.....	88
Corrugator.....	15
Harness.....	75
Seed drill.....	150
Small tools.....	50
	758

LIVESTOCK

3 horses.....	250
1 cow.....	75
Poultry.....	50
	375

Total..... 3,683

As a general proposition the settler will not make a very large return the first year. He will be busy getting established, erecting buildings, fences, and getting the things together to farm. Under such circumstances he will have to live off his capital, buy hay and feed, and pay operating expenses. He will grow some feed for his horses and cow and grow a garden the first summer.

To the above costs the settler will expend the following operating expenses:

Living expenses.....	\$600
Water charges (operation and maintenance only).....	160
Taxes.....	100
Fire insurance.....	25
Hay and grain.....	100
Labor and miscellaneous items.....	500
Total.....	1,485

This sum added to the development expenses makes approximately \$5,000. If furniture is needed it will be an additional expenditure. Later a buck rake will have to be provided at a cost of \$100, hay stacker (material only) \$40, and 10 cows will be needed at a cost of \$750, as well as a cream separator and dairy utensils. Two or three brood sows and day-old chicks will be needed as soon as sufficient feed is made available.

(Continued on page 172)

STRONG INDORSEMENT OF PROJECT BY LOCAL COMMITTEE

Committee of representative business men believes project entirely feasible; that banks will be willing to finance worthy settlers; and that settlement should be easy

(Continued from page 171)

From the above it is readily seen that from \$6,000 to \$7,000 can be expended wisely for things which are really indispensable. If he has not the capital to do this, then he must go into debt for all he can get and do without that which he can not obtain. It is fully realized that one settler can succeed with very little capital and another fail with \$10,000; much depends on the man. Still, projects will be settled by people of average ability, and if a large number of them are to succeed they must possess capital or the equivalent of it. Now as never before the things that go into a farm to make it fully productive come high. People who will pioneer and get along as they did a quarter of a century ago are scarce. High wages and the little luxuries of city life are still drawing cards and prevent many from going into agriculture. Land seekers with capital are scarce. The average settler now seeking land possesses a Ford car, from \$1,000 to \$2,500 in cash, and perhaps enough furniture to furnish a modest home. Often he has not even the amount of cash mentioned, but has a team, wagon, some farming implements, and a few cows. He is looking for an opportunity to become a home owner. If many of this type are to succeed, they must have long-time credit for clearing the land, erecting buildings and fences, and to do the many things necessary to bring a raw piece of land into a highly productive farm. This credit should be furnished on the security of improvement, erected under guidance and in accordance with a well thought-out plan and adequate to the needs of the particular farm, and then only when such improvements as are insurable are insured for at least the amount of the loan. These loans should be repaid on the amortized plan extending over a period of 20 years and bearing interest at $4\frac{1}{2}$ to $5\frac{1}{2}$ per cent. Such credit can not be extended to all comers but must be at the option of the loaning agency. The applicant who receives it must be worthy, and possess those characteristics of honesty, industry, and moral stamina as to make the highest use of the opportunity offered.

If a considerable group of settlers are to follow a general program of agriculture as previously discussed, they will need the constant help and assistance of a resident agriculturist, qualified by training and experience, until the settlers become thoroughly established. It should be his duty to show them the available

land, help them make a wise selection, and finally plan a sound and successful agriculture. In connection with this attention would be given to cooperative purchasing, cooperative marketing, cow testing for production and diseases, the promotion of bull rings, seed selection, and the many other things necessary to organize a rural community to work together to solve their social and economic problems. This work will not conflict with the county agent or other existing agencies, but will fit in with their activities to the extent of intensifying and supplementing such work, especially in the early period of development when such help is most needed.

The town of Baker, which would be the trading center for the Baker project, is well served with banks, which are in a healthy financial condition. No difficulties are experienced by settlers who have feed to obtain credit for the purchase of cows or other livestock or for other short-time loans needed for planting and harvesting. The interest rate is 8 per cent. The Federal Land Bank of Spokane, Wash., serves this territory, and makes loans only on cultivated lands served at least with a partial water right. Loans are not made on dry farms.

The 1923 report states that the farms of settlers now residing in the district are generally mortgaged. Most of this credit was furnished by the Federal land bank. Last year good crops were harvested and the settlers generally improved their conditions.

Raw land is generally assessed for taxing purposes at \$2.50 an acre and improved farms mostly tillable at about \$40 an acre. The tax rate for the five school districts included in the Baker project ranges from 20.2 mills in one district in 1924 to as low as 13.2 mills in another, with an average of 17.5 mills for the two years 1923 and 1924. New and larger schools will be needed and a consequent increase in taxes will no doubt take place, but it is unlikely that taxes will increase to more than \$1.25 an acre for some years to come. Assuming that construction charges will be returned at the rate of \$1.50 an acre a year and that operation and maintenance will be a maximum of \$2.50 an acre, the fixed charges for taxes and water will not exceed \$5.25 an acre. Interest, of course, on borrowed money will increase this amount.

The irrigation district is organized and can enter into a contract with the Bureau of Reclamation for the full payment of the construction costs of the project. This is in accordance with the new policy of the bureau, which will undoubtedly work out much more satisfactorily than if contracts were entered into with individual water users.

The committee concludes that on the basis of the above recommendations and of the proposed reclamation act providing for the repayment of the construction charges at the rate of 5 per cent of the gross annual returns, the project is feasible.

GEO. C. KREUTZER,
Director of Farm Economics,
Bureau of Reclamation.

G. R. HYSLOP,
Agronomist, Oregon Experiment Station.

M. H. LAPHAM,
Associate Soil Technologist,
United States Department of Agriculture.

GEO. C. IMRIE,
Assistant Engineer,
Bureau of Reclamation.

LOCAL COMMITTEE INDORSEMENT

BAKER, OREG., September 6, 1924.

MR. GEO. C. KREUTZER,
Director of Farm Economics, Bureau of
Reclamation, c/o Oyehee Hotel or Recla-
mation Service, Boise, Idaho.

DEAR SIR: As per your request we herewith hand you report of the findings of the committee on an 80-acre unit of land under the Baker irrigation project containing recommendation of farming.

Price of raw land under project from \$2.50 to \$7.50, an average of \$5 per acre.

80-acre unit, kinds of farming

15 cows, 10 milking at all times; average of 10 per month; per year.....	\$1,200
110 ewes; average of 125 lambs, at 8 cents.....	1,000
Average of 9 pounds wool; 900 pounds of wool, at 30 cents.....	297
10 brood sows; average of 7 pigs per year, 2 litters; 140 pigs per year 200 pounds weight, at $7\frac{1}{2}$ cents per pound.....	2,100
10 dozen hens, eggs, and fryers.....	250
Gross production.....	4,847
Or an average of \$60.58 per acre.	

We realize this can be done only by a class A man who thoroughly farms his land. Have some farmers now under project who have full water rights and are now getting practically the above results on sheep, hogs, and cattle; and are herewith attaching a draft of an 80-acre farm subdivided as we think will get best results.

(Continued on page 173)

RECLAMATION ON BUSINESS LINES

(From the Portland Oregonian, Oct. 17, 1924)

Approval of three Oregon reclamation projects by commissions of specialists appointed by the reclamation bureau is the more gratifying because they treat each project as a business proposition from estimate of construction cost to return on the investment in the shape of crops. Land is classified, the crops that it would grow are named, the type of settler that would produce those crops and the capital that they would require are specified, the prices the settler would receive are estimated and on this basis it is calculated that he could make annual water payments and amortize loans. Thus each of these Oregon projects is demonstrated to be a sound business investment for Government funds, and Secretary Work can confidently recommend it to Congress.

This is the fruit of the work of the fact-finding commission and of its elaboration in detail by Director Mead. There is no "boom stuff" in the reports; they dodge no unpleasant facts. To read that in order to succeed with an 80-acre farm a settler must have not only industry and experience but a capital of \$7,500, will be an eye-opener to some who have fondly imagined that to "make the desert blossom like the rose" was no trick at all. But the three commissions not only tell difficulties that will be encountered; they recommend ways to overcome them.

They would squeeze the speculative value out of private land before the Government spent a dollar. They would have the Government prepare and seed half of each farm and collect the cost in yearly installments. They would supplement the settler's own capital with a loan from a land bank, payable in the same way. They would place a competent agriculturist on each project to advise settlers, and would combine them in marketing associations. Finally, they would fix annual payments on construction cost at 5 per cent of gross returns from the land.

If this plan be faithfully followed out and if adequate allowance has been made for the unexpected, these three projects in Baker, Owyhee, and Vale should prove successful business enterprises to serve as models. From them there should be no reports of delinquent payments, no appeals for extension of time, such as have given eastern Congressmen an excuse to vote down reclamation appropriations as waste of public money. Other Oregon projects can then be taken up, for Oregon will gain a good name for making good with its projects. The same plan, perfected by experience, can be applied in other States. Repayment of capital invested in construction will then be assured, and the reclamation fund will revolve as was intended when the original reclamation act was passed.

SUGAR-BEET GROWING IN WESTERN STATES

The accompanying table gives comparative costs in 1915-16 of growing sugar beets on 165 farms in the Los Angeles, Oxnard, and Salinas areas in California, and on 305 farms in the Billings area of Montana, which includes the Huntley irrigation project. The average value of the land per acre in the California area was reported as \$372 and that of the Montana area as \$126.95. The average yield per acre was 13½ tons in the California area and 10¾ tons in Montana.

Cost per acre of growing sugar beets, 1915-16

Items	California	Montana
Labor:		
Manuring.....	\$5.31	\$3.31
Plowing.....	3.25	2.90
Cultivating (chiseling).....	1.72	
Disking.....	.97	1.09
Rolling.....	.70	.30
Harrowing.....	1.30+	1.05
Floating and leveling.....	1.00	.89
Planting.....	.44	.40
Cultivating.....	1.32	1.74
Hand work (contract).....	16.24	18.64
Irrigation.....	1.18	1.62
Lifting-harvesting.....	3.07	2.18
Hauling.....	4.16	5.02
Total labor.....	40.66	39.14
Actual average, all areas.....	34.03	36.35
Materials.....	3.56	5.51
Overhead: Interest and rent.....	21.30	11.85
Machinery.....	2.85	2.64
Miscellaneous.....	1.06	.44
Total cost.....	62.80	56.79
Gross receipts.....	81.50	68.49
Profit.....	18.70	11.70

SALT RIVER PROJECT TO HAVE PUBLIC PARK

Steps have been taken to transfer approximately 14,000 acres of land in the Salt River Mountains of Arizona to the city of Phoenix for public park purposes. Final certificates to the land, which is a part of the public domain, will be given the municipality upon the payment of \$1.25 per acre by the city of Phoenix to the Government and compliance with the necessary regulations.

On the recommendation of the Secretary of the Interior, a special act was passed at the last session of Congress providing for the sale of the tract to the city. The land will furnish recreational facilities not only for the residents of this municipality, but also for the entire Salt River Valley, which has a population of approximately 100,000.

Remember the week of November 17-23, set aside by President Coolidge as American education week.

BAKER PROJECT REPORT

(Continued from page 172)

We know that the above is not an average of what will be done under the project, but believe that an average of \$35 to \$40 per acre can be easily maintained with a full water right under the project.

We believe that some system of extending long-time credit to settlers as outlined by Doctor Mead and yourself would be very beneficial and result in securing the best type of farmers for the project. The guidance and advice that would be necessary in carrying out such a program would no doubt eliminate the costly mistakes that have been made in the past. We do not believe such credit should be extended excepting under the direction of the Bureau of Farm Economics, and we sincerely hope that some such system will be adopted.

The banks of Baker are amply able and willing to finance any worthy settler on this project for his current needs and assist in the development of the project. We believe the settlement of the project

will be easy, for the reason that we have many dry farmers and renters who have equipment and some capital in this vicinity who would welcome an opportunity to get an irrigated farm with a good water right.

Clearing of land should not cost to exceed \$5 per acre and owing to the topography of the land very little leveling will be necessary.

With our knowledge of farming and stock conditions in Baker County (after having lived here many years), we believe the project entirely feasible and recommend its early construction.

T. G. MONTGOMERY,
President, Citizens National Bank.
WM. POLLMAN,
President First National Bank,
and Baker Loan & Trust Co.
F. A. PHILLIPS,
Secretary of District
Farmer and Stockman.
W. A. STEWARD, Farmer.

COOPERATIVE RECLAMATION BETWEEN STATE AND NATION

The time is opportune for State interest in reclamation to assert itself and lead onward toward full cooperation of national, State, and local interests

Reprinted from Engineering News-Record, September 18, 1924

MAKING the waste lands of the country fit for human habitation and able to support a home-seeking population is one of our greatest public-works problems and will long continue to be such. The huge sums of money spent on land reclamation in the West by the Federal Government and by private enterprise have not solved it, but on the contrary have brought to light progressively greater difficulties, not least those of agriculture and marketing.

Today the problem appears further from solution than ever. But long experience has gradually developed a principle which bears on most of its difficulties, namely, that a reclamation enterprise is not the concern of one man or one authority, even if that authority be the Nation, but is the joint concern of many, who must cooperate with a will if the enterprise is to succeed. Such cooperation is capable of bringing all the difficulties under control; where it can not solve them it will at least show a way to avoid them.

The reclamation advisers' report of last spring brought out the overshadowing importance of cooperation. While it stopped short of putting the conclusion into definite terms, it presented abundant proof that if land reclamation can be made in fullest degree cooperative it will contain the principal requisite of success. The difficulty in doing so is a combined financial and psychological one, how to bring together in effective partnership the money and effort of the many men and groups of men who are concerned in the reclamation of a particular piece of land.

It has been believed by many that the report of the reclamation advisers dealt fully with the problem of developing waste land, and set forth the method which should be followed in accordance with the requirements of sound national development to carry on land reclamation successfully. That is not the case. In discussing future reclamation the report tacitly accepts the principle on which the old reclamation law rests, namely, that the development of waste lands is necessarily and properly a Federal enterprise. Yet the unfortunate working of this principle, especially when it came to be applied to privately owned land, is well portrayed in the report. No better proof could be asked that noncooperative Federal reclamation is foredoomed to failure.

Virtually all the methods that have been applied to irrigation development heretofore have placed the main burden of providing the required money and initiative upon one of the parties concerned.

"It will be recognized at once that while land reclamation is essentially a local problem its magnitude and its many difficulties make it a proper field for national aid in financing. A partnership between State and Nation on such a basis can be readily developed. It would necessarily include the financing and operation, and in fact also planning, the latter because the success of the enterprise depends to a large extent on local needs, local resources and soil and water possibilities, many of which are most definitely known to the local people themselves."

The other parties either remained outside the enterprise or they fell into an attitude of dependence and unconcern. Effective cooperation was never obtained. The difficulties of the enterprise always proved to be much heavier than expected, in agricultural and economic respects as well as financial, and they grew as time went on. Sooner or later the burden could no longer be borne without help, and a crippled enterprise resulted. This is so in spite of the fact that in most irrigation enterprises the physical factors of success were present. Water, soil, climate, money, and people were there, and the Government was an accommodating creditor; nevertheless success was missed through failure to secure that active cooperation which would have made the good will and energy of all interested parties a guaranty of progress.

Reclamation was made a national enterprise by the 1902 law under unusual circumstances. In the nature of things, the creation of a new agricultural area within a State is of more immediate concern to that State than to a far distant State or to the Nation, but 20 years ago this State interest was not effective to the necessary degree. Moreover, the Western States were poor and their technical resources scanty. It was therefore thought desirable to allot Federal funds to the service of arid-land development and to

place the work in charge of a Federal bureau, and nothing was done to enlist the State as an active partner in reclamation. Now that the States have come to be prosperous and strong, it is possible to correct this error.

It is true that the local community, the township or county within which the enterprise is located, is even more directly interested than the State. But the local community sometimes is not in existence until the development is completed, and in the best of cases is weak. The local interest has received extensive recognition in irrigation legislation, most completely so in irrigation district laws, which in fact recognize none other than the local interest. The failure of these district laws to take account of the weakness of the local community was an error that often proved fatal in the absence of State or national assistance. The many unfortunate experiences in this type of development helped to bring to the front the idea of national aid, culminating in the passage of the Newlands Act, which embodies the opposite error to that of the district laws.

By failing to enlist State or local cooperation, and by presenting the demoralizing offer of free Federal money, the Federal reclamation law in its actual working has brought about the growth of an unconscious feeling that the development of the dry western wastes is a debt which the Nation owes to its people. In some way it has come to be believed that the country at large is obligated to furnish the irrigation farmer a debt-free estate and a profitable living. In such an atmosphere it is difficult for energetic cooperative effort to come to life spontaneously.

When we reviewed the reclamation situation a year ago, we pointed out the direct interest of the State in the development of its new local agricultural communities, and urged that the States take up their proper share of reclamation responsibility. At that time the outstanding feature of the situation was that the old reclamation law not only does not require State effort, but gives no opportunity for it. But the idea that the reclamation of arid regions is a local problem has grown steadily. Much recent legislation in Western States aims to stimulate reclamation work with indirect State support. The time is opportune for State interest in reclamation to assert itself and lead onward toward full cooperation of national, State, and local interests.

Heretofore the financial and political factors in reclamation have been so obtrusive that effective State cooperation seemed impossible. The remarkably successful cooperation between national and local authorities found in Federal-aid road building offers encouragement, however. Financial partnership of State and Nation in road improvements has made an excellent showing, especially because it was supplemented by a wisely handled partnership in the technical direction of the work and complete reference of the problems of operation and maintenance to the local authorities. The \$400,000,000 of Federal money that have gone into road construction represents more than twice the investment in Federal reclamation. If the methods applied to this great investment have proved so uniformly successful, it is highly probable that a similar policy can be made to fit the reclamation problem. It offers the long-sought way out of the impassé which the board of special advisers on reclamation portrayed in its report last spring.

In a remarkably interesting study just published by the Department of Agriculture, reviewing land reclamation policies, two important conclusions are presented: First, that national subsidy of land reclamation is unjustified, and, second, that if local interest justifies the subsidizing of reclamation the subsidy should be local. Applied to the present argument, these conclusions mean that the State has very much more at stake in the success of a reclamation enterprise than has the Nation. This fact should find expression in a large monetary participation by the State in getting the enterprise going. But the Department of Agriculture's conclusion also means that Federal aid for reclamation, unlike that for road construction, is to be treated as a loan to the State, not as a gift or gratuity to the farmers who will take up the land.

Much confusion of thought has resulted from the fact that since 1902 there has been in existence a national reclamation fund, in which money from public land sales and certain other sources of national income has been set aside for the exclusive benefit of the Western States in irrigation development. To appreciate the situation more clearly, it is well to consider that the need for land reclamation has nothing to do with the existence of this fund, and that if the fund were wiped out to-morrow, or merged in the General Treasury moneys, the country's attitude toward reclamation development should be fully as progressive and helpful as it is in the presence of this fund. Reclamation is not to be regarded as a device for spending public money that otherwise would lie unutilized.

Ignoring the reclamation fund, then, it will be recognized at once that while land reclamation is essentially a local problem its magnitude and its many difficulties make it a proper field for national aid in financing. A partnership between State and Nation on such a basis can be readily developed. It would necessarily include the financing and operation, and in fact also planning, the latter because the success of the enterprise depends to a large extent on local needs, local resources, and soil and water possibilities, many of which are most definitely known to the local people themselves.

RAIN BREAKS DROUGHT ON ORLAND PROJECT

An unexpected and entirely unpredicted rainstorm occurred at Orland on October 5, the precipitation amounting to 1.68 inches. Considerable snow has also fallen on the upper reaches of Stony Creek watershed.

This rain breaks the long, severe summer drought and water-supply shortage with which the project has been confronted. The rain will be of considerable value to project orchards, particularly citrus orchards, which, as a result of some 10 or 12 days of continuous north wind, had begun to show indications of withering and possible damage.

In arranging a financial partnership as indicated, the difficulty of a dual debt resting upon the property may appear troublesome. But it is obvious that the obligation of the property can be made

to the State, and that the State can in turn obligate itself to the Federal Government for the national share of the loan. This is the more natural because management and operation would preferably be in the hands of the local authorities. State control seems in every way best adapted to deal with the complications of management; the national participation in operation should be restricted to advisory and demonstration service.

A system of the kind indicated seems capable of overcoming the primary evils which beset recent reclamation and threaten future enterprises. The methods now used for making reclamation appropriations in Congress largely disregard the economic practicability and desirability of projects, but represent merely a struggle for local advantage to this or that group of landowners and politicians. Under the system proposed, planning, construction, and settlement could be conducted as soundly as the development of the Federal-aid road system. Competition between States for reclamation work and trouble from conflicting and unsettled water rights would tend to disappear. A foundation would be laid for rapid and sound development of new agricultural areas, and their proper assistance by aid in agriculture, marketing, and transportation. The disastrous spirit of repudiation and voluntary bankruptcy would disappear from the irrigation regions. Finally, a most healthful influence would be exerted upon private irrigation developments, and a sound growth of the West more completely assured.

Minidoka County has the largest purebred flock of Suffolk sheep in the United States, the property of Storms Bros., near Rupert. They are a fine flock of 50 ewes.



Fruit and nuts grown on the irrigated orchards of the projects in 1923 had a total value of more than \$9,000,000

CONSTRUCTION OF AMERICAN FALLS RESERVOIR ASSURED

Plans consummated by payment to Government of checks aggregating \$1,989,316, representing payment of the share of the cost of the reservoir to be borne by the American Falls Reservoir district

17-1 **THE NORTHWESTERN NATIONAL BANK OF MINNEAPOLIS** 17-1

MINNEAPOLIS, MINN. OCT 13 1924 No. 3685

PAY TO THE ORDER OF *Hubert Work Secy of Interior* \$1,274,991⁰⁰

ONE MILLION TWO HUNDRED SEVENTY FOUR THOUSAND NINE HUNDRED NINETY ONE DOLLARS NO CENTS

To CHASE NATIONAL BANK,
1-74 NEW YORK, N. Y. } *J. H. [Signature]*
CASHIER

Part of the money for the American Falls development

CONSUMMATION of plans for the construction by the Government of an immense reservoir at American Falls, Idaho, to furnish additional water to irrigate approximately 1,500,000 acres of land in the Snake River Valley was announced on October 16 by Secretary Work.

Checks aggregating \$1,989,316 closing the deal for the big undertaking were handed to the Secretary by a delegation of Idaho business men headed by Senator Gooding, of Idaho. The money represents the payment of the share of the cost of the reservoir to be borne by the American Falls Reservoir district. One of the checks, reproduced above, is the largest ever paid the Government for such an enterprise.

The reservoir's construction is the first step on a large scale taken to carry into effect the recommendations made by the special advisory committee on reclamation, providing that in the future the management of reclamation projects should be in the hands of water users' associations and districts instead of the Government. Construction of the dam has been thrown open to competitive bids which were opened on October 20, 1924, at American Falls, Idaho.

The Snake River Valley in Idaho is one of the largest irrigated valleys on the American continent. There are thousands of irrigated farms with a total population of 250,000 people. A part of the valley is divided into two irrigation districts, consisting of the American Falls Reservoir district and the Empire irriga-

tion district. In addition there are 60 canals that supply water to areas from 1,000 to 100,000 acres in size. The Minidoka reclamation project, one of the largest Government projects, is also located in the valley and also obtains its irrigation water from the Snake River watershed.

Inadequate water supply of these various irrigation districts along the valley including the Minidoka Government project led to negotiations for the construction of a new reservoir which culminated in Secretary Work's announcement. According to the contracts made with the Interior Department the American Falls Reservoir district and the Empire irrigation district in addition to the farms benefited by the new storage from 60 other canals will pay two-thirds of the cost of the immense reservoir while the Government will pay approximately one-third, covering the additional water for the Minidoka project.

The cost of the reservoir when completed will amount to \$8,000,000. It will be 25 miles long, 12 miles wide with an average depth of 40 feet, and will hold 1,700,000 acre-feet of water. The city of American Falls, Idaho, had to be relocated in order to build the reservoir as well as several miles of the Union Pacific track that traversed the area to be occupied by the immense reservoir. The additional water supply furnished the farmers throughout the valley is expected to enhance the crop production by approximately \$40,000,000 annually. The production of beet sugar alone is expected to

be increased by 7,000,000 sacks a year, which will double the operation of eight beet sugar factories in the valley that have been running only half time.

Both the American Falls Reservoir district and the Empire irrigation district raised the money to pay their share of the construction of the reservoir through bond issues. The Idaho delegation that completed the final plans for the big construction undertaking with Secretary Work included Senator Gooding, of Idaho; R. E. Shepherd, president of the American Falls Reservoir district; W. C. Creer, manager of the Empire irrigation district; W. O. Cotton, engineer representing the smaller canal districts; and J. E. Kelly, manager of the Utah-Idaho sugar factory, of Shelley, Idaho.

Some of the other districts, in addition to the American Falls Reservoir district, which presented its checks for \$1,989,316, have paid to the Government part of their share of the cost of the reservoir.

"The NEW RECLAMATION ERA is an interesting and important publication issued by the Department of the Interior, the publishers being Secretary Hubert Work and Commissioner Elwood Mead. With their developing experience as editors of this fine little publication they ought to be capable of getting out almost any magazine, except for one thing—they evidently have their minds running strong on western affairs, so it is doubtful that they could get a job with Harper Bros. or the Curtis Co."—*The Pueblo Chieftain*, September 14, 1924.

PICTORIAL LESSONS IN PRACTICAL RECLAMATION

LESSON NO. 9



Tractor cultivator in cotton field on the Salt River project, Arizona

THE cultivator is an implement which is too little appreciated and too sparingly used on many irrigated farms. Unfortunately many farmers believe that irrigation gives the same or as good results as cultivation. This is based on the assumption that the principal reason for cultivation is the retention of moisture in the soil, and it is reasoned that it is more simple to provide more moisture by irrigation than it is to save moisture by cultivation. The retention of soil moisture is one of the principal functions of cultivation, but there are other reasons which must not be lost sight of. The plant-promoting organisms in the soil require certain conditions under which they can do their best work. These favorable conditions call for moisture, but not excessive moisture. They also call for soil warmth and air, and soil is warmed and aerated best by cultivation, whereas the application of too much water makes the soil cold and closes the air passages. It should be readily understood that irrigation can not take the place of cultivation in any degree, but cultivation can well be substituted for much irrigation.

Acting on the practical theory that cultivation of the soil aids the work of the

plant-promoting organisms in the soil, it is well to cultivate as early as possible after seeding. Many good farmers cultivate soon after planting and before the plants come through the ground. Then, as soon as the plants come through they harrow the field; harrowing is only another form of cultivation. After the plants are up sufficiently high that they will not be covered by dirt thrown by the cultivator shovels, deep cultivation close to the plants should be given. Subsequent cultivations should be increasingly shallow and more distant from the plants to prevent damage to root systems. At least two cultivations between irrigations should be the rule—one as soon after irrigation as the condition of the soil will permit and the next several days before irrigation, when the furrowing shovel should be attached to the cultivator to prepare the irrigation furrows.

The depth of cultivation should be governed by several factors. Plants have different rooting habits; some dispose their root systems close to the surface of the ground and these require the most shallow cultivation. Other crops of deep rooting habits permit and profit by deeper cul-

vation. Some crops have wide-spreading roots and some have a single perpendicular root. The depth to which the seed bed has been broken also is important. Given a deep mellow ground to feed in, plants will strike deep for nourishment, but with a shallow seed bed and a hard and unfertile subsoil the roots cling close to the surface. As a rule plant roots will go down after moisture, and this tendency should be encouraged. If too frequent irrigation is given, the roots will obtain moisture near the surface and be exposed to damage from the cultivator shovels as well as from the drying action of wind and sun.

No single phase of crop production is independent of all other phases; every operation must be done mindful of all the conditions. In no case should irrigation be substituted for cultivation. Every cultivation properly performed during the period when plants need cultivation is a good investment. If in doubt, cultivate.—*I. D. O'Donnell.*

The electric motors already installed on Danish farms represent the power equivalent of more than 2,000,000 men.

LLOYD BARRAGE AND CANALS PROJECT

ON October 24, 1923, Sir George Lloyd, governor of Bombay, India, laid the foundation stone of the Lloyd (Sukkur) barrage and canals project, which has been termed "the greatest irrigation scheme in the world." The following items concerning the project are from a report published in a recent issue of Commerce Reports.

The plan consists of the barrage, or dam, at a point 3 miles below Sukkur, to span the River Indus, which flows through Sind Province, and also seven great canals. The Province is about 350 miles long from north to south and varies in width from 250 to 120 miles. About half the total area of 30,000,000 acres is culturable soil and 50 per cent of the total population of 3,280,000 depends upon the land for existence. In years of copious rainfall more than 70 per cent of the crops are raised by irrigation, and in years of low rainfall about 90 per cent.

The barrage will be 4,725 feet in length and its 66 gates will provide for a flow of 1,500,000 cubic feet per second. The combined length of the main canals will total 805 miles; of the branch canals 766 miles; and of the distribution system, 3,724 miles. The canals will have a combined discharge of 46,672 cubic feet per second and the areas commanded will total 8,132,000 acres, of which it is expected that about 5,500,000 acres will be cultivated.

HOW A DAIRY HERD HELPS THE FARMER

The dairy herd conserves and even increases soil fertility, assuring good yields of farm crops in future years. At the same time the herd provides a sure, prompt, and profitable outlet for grains and roughages grown on the farm. Land that supports good dairy herds becomes richer year by year, whereas land devoted to raising grains and hay for market soon becomes sadly depleted, unless carefully managed and unless commercial fertilizer is purchased. Every ton of corn sold off the farm, worth in normal times about \$20, takes with it \$6.50 worth of plant food; every ton of wheat, worth \$35, takes \$17; every ton of butterfat, worth about \$1,000, takes only 49 cents worth of plant food. Meanwhile, the herd is returning many times this amount in fertility.—Agricultural Department, Union Pacific System.

The cost of construction of the barrage and canals has been variously estimated at \$70,000,000 to \$80,000,000.

The proposed rates to be charged for a flow supply of water from the canals vary from 76 cents to \$2.40 per acre per annum for the first 10 years, after which they will increase slightly over the second and third 10-year periods. Lift irrigation rates are to be one-half those for flow irrigation.

It is estimated that the ultimate annual net revenue to be obtained from the project after paying working expenses will amount to \$5,820,000, which, if realized, will represent a substantial return on capital invested. In addition to this direct revenue there will be the increased production and wealth of the Province and of India as a whole as a result of the successful operation and fulfillment of the purposes of the project.

TASMANIAN LAND LAWS SHUT OUT SPECULATORS

In the State of Tasmania, Australia, it has been found by long experience that where the conditions of settlement are made too easy, a very undesirable class of speculators is encouraged, who take up the land for speculative purposes, and only hold it until they can sell at a profit, often shutting out the genuine settler, who would turn his selection to some practical use. Therefore it has been found necessary to demand a certain price for land, and to impose certain conditions of residence and improvement thereon. As far as is humanly possible, the land laws of Tasmania have been brought to a point where the bona fide settler is encouraged to the greatest extent, and the speculator and "land-dummer" shut out.—Tasmania Crown Lands Guide.

THE SUN RIVER VALLEY FAIR

THE farmers on the Fort Shaw division of the Sun River project, Montana, recently held a fair at Simms. Mr. K. W. Bergan, principal of the Simms public schools, who had an active interest in the management of the fair, has written the following description for the NEW RECLAMATION ERA:

"September 18 was a splendid day and many people took advantage of the weather to attend the Sun River Valley Fair held at Simms. Not only was the irrigation project interested in this venture but many interested people from Great Falls and surrounding towns came to witness the great display of agricultural products.

"Mr. G. A. Rassley, instructor of the Simms High School, with his class of 24 boys, had the exhibition of farm products in charge and they were kept very busy, as could be seen from the large display that they arranged for. The school auditorium had three tables 60 feet long and two 40 feet long covered with vegetable and farm products. The stage held the flower display, while one of the classrooms in the basement had school exhibits, and the women held their exhibit at the Woman's Club building.

"County Agent McSpadden hauled four truck loads of material from this community fair to Great Falls to be used in making up the Cascade County exhibit at the State fair. The corn exhibit was

exceptionally strong, in both quality and number of entries. It occupied a table 40 feet long and 3 feet wide, with about 60 entries of mature corn of the most common varieties. The potato exhibit came next in variety and quality of exhibits. It was noted that the varieties had become more standardized with fewer freaks and better selection. The judge had a hard task in deciding the awards in this department. Another very interesting department was the fruit exhibit, all grown on the project. Fourteen varieties of apples were shown, one of tame grapes, four of strawberries, and one of raspberries. The dairy department showed some splendid Holstein cows. The first three to obtain awards came from the three best herds in the community.

"The entertainment for the day included music by the Great Falls Community Band and outdoor sports. Tom Jackson, a Carlisle graduate and holder of the State championship in bucking contests, again carried off money for riding the worst horse successfully. The women's rolling-pin contest attracted many women, while foot races and many other attractions entertained the people. The day was a success from the point of view of community spirit, size of exhibitions, and attendance. The fair promises to grow steadily from year to year."

COST OF CROPS IN IDAHO COUNTY

The accompanying table, compiled from Research Bulletin No. 2 of the agricultural experiment station, University of Idaho, shows farm costs and relative profitableness of seven crops grown in Twin Falls County, Idaho, in the years 1919 and 1920.

The table is based on investigation of an area within a radius of about 8 miles of the City of Twin Falls, Idaho, and covers crops of clover seed, beans, sugar beets, potatoes, hay, and wheat. The average value of lands per acre was nearly \$400 for each year. It will be noted that there was a loss on five crops

in the year 1920, if the interest on the investment amounting to nearly \$30 was included in the cost. This interest is based on a charge of 7 per cent on the value of land, and if this amount was not included in costs there is still a loss on three of the five crops, the largest loss per acre being on the potato crop, which amounted to about \$50 per acre.

These two tables reflect the losses from the war period, as the year 1919 was a period of high prices for crops and the year 1920 marked the slump in the price of agricultural products.

One of the important conclusions reached in this pamphlet is that cropping systems and rotations must be adopted with a view to maintaining an increasing productiveness of the soil. Farm experience indicates that this may be accomplished by producing leguminous crops, the choice lying between alfalfa grown for hay and seed and clovers. One of the problems that also has to be considered is the control of weeds; on the farms where silage is produced on the area under consideration corn and sunflowers may be grown to clean the land.

Another important problem is the marketing and choice of crops. Sugar beets are bulky and can be grown only near a sugar factory and the relative profitableness of competing crops must be considered. The trend of prices, costs, and profits must be studied in order to solve accurately this problem.

Cost of growing specified crops in Twin Falls County, Idaho, 1919¹ and 1920²

Items	Clover seed				Alfalfa hay		Sugar beets		Potatoes		Beans		Wheat	
	Alsike		Red		1919	1920	1919	1920	1919	1920	1919	1920	1919	1920
	1919	1920	1919	1920										
Labor.....	\$10.30	\$14.82	\$16.28	\$15.83	\$21.44	\$20.32	\$73.23	\$89.60	\$56.89	\$70.88	\$29.73	\$34.72	\$19.33	\$20.68
Materials.....	7.97	8.78	7.94	8.66	3.99	4.20	9.18	9.41	37.00	74.33	8.99	11.23	8.39	9.01
Other.....	15.70	21.51	18.06	17.54	10.49	10.32	19.77	23.36	24.06	33.67	18.94	22.11	15.61	15.33
Interest.....	23.95	29.58	27.62	29.13	27.25	27.37	30.91	31.97	30.59	31.53	26.95	27.29	28.55	27.89
Total.....	57.92	74.69	69.90	71.16	63.17	62.21	133.09	154.34	148.54	210.41	84.61	95.35	71.88	72.91
Credits.....	1.37	.57	16.56	5.69	1.93	1.02	4.31	4.98		1.78	2.78	1.52	1.63	.64
Net cost.....	56.55	74.12	53.34	65.47	61.24	61.19	128.78	149.36	148.54	208.63	81.83	93.83	70.25	72.27
Profit ³	66.69	21.99	84.37	-38.35	5.97	-28.55	-19.88	13.32	99.44	-49.96	2.87	-21.27	5.93	-12.52
Receipts.....	123.24	96.11	137.71	27.12	67.21	32.64	108.90	162.68	247.98	158.67	84.70	72.56	76.18	59.75

¹ Land values, \$380 per acre.

² Land values, \$390 per acre.

³ Loss on sugar beets in 1919; loss on red clover seed, alfalfa hay, potatoes, beans, and wheat in 1920.



Thousands of the holiday birds are grown for market yearly on the irrigation projects. Left: Bronze female. Right: Narragansett male

IRRIGATION AIDED IN MEXICAN STATE

The governor of the State of Jalisco, Mexico, has recently issued a statement calling the attention of all persons engaged in farming in the State to the provisions of the decree of the State congress promulgated July 24, 1923, which extends certain tax reductions on lands brought under irrigation after the date of promulgation.

Under the decree a 50 per cent reduction in real estate taxes is made (from the amount previously paid as such to the State) on all lands brought under irrigation, and it is provided that for 10 years no revaluation of assessments will be made.

Agriculturists who undertake irrigation projects or the mucking of lands may, under regulations governing notice of intention and proofs of completion of work, receive exemptions from a re-assessment of values for 10 years on the improved areas and from an assessment on the improvements made thereon, provided they form part of an agricultural undertaking.

For 10 years irrigation concerns will be allowed the minimum tax rate stated in the budget assessed against concerns or companies, regardless of what their capital investment may be.

WHOLE OR CUT SETS IN POTATO GROWING

The successful determination of the most profitable size of set to use in potato growing and whether it should be planted whole or cut primarily involves a careful study of the proper spacing to give to each size of set in order to obtain the maximum yield. Seasonal conditions have a very definite influence upon yield, particularly with respect to the size of the tubers. Abundance of moisture and plant food throughout the growing season insures a maximum crop from whole and large-sized cut sets; whereas lack of these two prerequisites favors the medium-sized cut sets, because fewer tubers are produced, and in consequence they have a better chance to reach marketable size.

"The various articles, especially in the recent issues, of the RECLAMATION ERA, are wonderfully instructive and helpful, and should be read by every water user. I am strongly in favor of practical farm advisers."—*Floyd Seybolt, president Normal State Bank, Lincoln, Nebr.*

Hogs are likely to become unthrifty if they are confined and fed on grains with little other feed.

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION,
Yakima, Washington, Sept. 4, 1924.
Dr. ELWOOD MEAD,

Commissioner, Bureau of Reclamation, Washington, D. C.

Dear Dr. Mead: I have taken great pleasure in showing the employees on the project the memorandum for all field offices dated August 28th, signed by Dr. Hubert Work, Secretary of the Interior, and yourself, and it has had the effect of assuring all that their sincerity and devotion to duty has been observed and is appreciated.

Communications of this kind are a great help in establishing an esprit de corps that promotes cooperation and loyalty in an organization of the nature and size of the operation and maintenance force on this project. It makes them feel that their work and problems are understood and that as long as they are honest, faithful, and efficient they will get kind consideration and fair treatment.

Due largely to the high grade of service rendered generally, and the careful handling of the water, the irrigation season on the Yakima project is drawing to a close with only a slight shortage of irrigation water during the last few days, which will not cause any appreciable loss to the farmers. This, with a very fair crop, good prices received for all produce marketed so far this year, and prospects for good prices for the crops yet to be harvested, is creating a spirit of optimism among the farmers that is exceedingly satisfactory to the operating organization and I know will be very pleasing to you.

The Yakima project organization joins me in expressing their respectful appreciation of your kind memorandum and will always endeavor to make our services such that they will be a help in solving some of the very many problems that come to you for solution and final decision.

Yours very sincerely,
J. L. LYTEL,
Superintendent.

More than 10,000 cooperative organizations in the United States report regularly to the Department of Agriculture regarding volume of business, membership, management, and operating methods. A vast clearing house for the exchange of cooperative information has thus been established which has yielded information on specific problems that has often been of great value to cooperatives.

The same degree of electrification of the farms of the United States as that of Swedish farms would require more than six times the present farm consumption.

IRRIGATION DEMANDS GOOD CROP ROTATION

Harold F. DePue, county agent for Richland County, Mont., writing for the Montana Farmer, points out that rotations are needed for best results on irrigated land. Some of the problems to be considered in determining what the rotation should be are the market for the crops, distribution of labor, soil conditions, soil-builder crops, and culture and labor required for the crops grown.

Perhaps first in importance is the market for the crops. This is essential for the cash crops or the system will be a failure from the beginning. Second, the system must provide for a proper distribution of the labor. A rotation can not be managed profitably if all the crops in the rotation must be planted or harvested at the same time. Soil conditions are especially important, as there are kinds of soil on which certain crops will not do well. The rotation should also be planned so that the crops will come in the proper sequence, that is, a cultivated crop after a hay crop. All these factors and many more must be considered.

Experiment stations, project experiment farms, county agents, farm demonstrators, and successful farmers in general on the projects are always willing to give advice concerning suitable rotations.

ACCIDENTAL MARKETING MEANS POOR MARKETING

The farmer
Plows in hope,
Plants in faith,
Harvests in prayer,
And markets by accident.

Of no successful business could this be said. Manufacturers fix definite selling prices before they start converting the raw materials. Merchants follow a definite plan of cost plus profit. Builders know their prices before a dollar is invested.

A few farmers—more than a million of them, in fact—are taking the accident out of marketing. Tobacco growers, cotton growers, and western fruit growers are included in the million. Members of the Arizona Pimacotton Growers are selling their crops on a definite plan with a large part of the accident removed. These million farmers know before they plow that they will receive the season's average price.—*The Associated Arizona Producer.*

In Denmark fully half the farms have electric service and in Sweden the 52,000 electrically equipped farms include 40 per cent of the arable land.

ADMINISTRATIVE ORGANIZATION FOR THE BUREAU OF RECLAMATION

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John H. Edwards, Solicitor for the Interior Department; E. K. Burlew, Administrative Assistant to the Secretary; J. H. McNeely, Assistant to the Secretary; John Harvey, Chief Clerk

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					Name	Office
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King Hill.....	King Hill, Idaho.....	G. H. Harris.....	E. V. Hillius.....	E. V. Hillius.....	B. E. Stoutemyer.....	Boise, Idaho.
Klamath.....	Klamath Falls, Oreg.....	H. D. Newell.....	N. G. Wheeler.....	G. R. Barnhart.....	H. L. Holgate.....	Portland, Oreg.
Lower Yellowstone.....	Savage, Mont.....	H. A. Parker.....	E. R. Scheppelmann.....	E. E. Roddis.....	Helena, Mont.
Milk River.....	Malta, Mont.....	G. E. Stratton.....	E. E. Chabot.....	G. S. Moore.....	do.....	Do.
Minidoka.....	Burley, Idaho.....	E. B. Darlington.....	E. C. Diehl.....	Miss A. J. Larson.....	B. E. Stoutemyer.....	Boise, Idaho.
Newlands.....	Fallon, Nev.....	J. F. Richardson.....	G. B. Snow.....	Miss E. M. Simmonds.....	Berkeley, Calif.
North Platte.....	Mitchell, Nebr.....	Andrew Weiss.....	L. H. Mong.....	V. E. Hubbell.....	Brooks Fullerton.....	Mitchell, Nebr.
Okanogan.....	Okanogan, Wash.....	Calvin Casteel.....	W. D. Funk.....	N. D. Thorp.....	H. L. Holgate.....	Portland, Oreg.
Orland.....	Orland, Calif.....	R. C. E. Weber.....	C. H. Lillingston.....	C. H. Lillingston.....	Berkeley, Calif.
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Riverton.....	Riverton, Wyo.....	H. D. Comstock.....	R. B. Smith.....	Henry Berryhill.....	Brooks Fullerton.....	Mitchell, Nebr.
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Sun River.....	Fairfield, Mont.....	G. O. Sanford.....	H. W. Johnson.....	F. C. Lewis.....	E. E. Roddis.....	Helena, Mont.
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Uncompahgre.....	Montrose, Colo.....	L. J. Foster.....	G. H. Bolt.....	F. D. Helm.....	J. R. Alexander.....	Montrose, Colo.
Williston.....	Williston, N. Dak.....	W. S. Arthur.....	W. S. Arthur.....	H. O. Melaas.....	E. E. Roddis.....	Helena, Mont.
Yakima.....	Yakima, Wash.....	J. L. Lytel.....	R. K. Cunningham.....	J. C. Gawler.....	H. L. Holgate.....	Portland, Oreg.
Yuma.....	Yuma, Ariz.....	P. J. Preston.....	C. A. Denman.....	E. M. Philebaum.....	Berkeley, Calif.

Large Construction Work

Minidoka, American Falls	American Falls, Idaho.	F. A. Banks ¹	H. N. Bickel.....	O. L. Adamson.....	B. E. Stoutemyer.....	Boise, Idaho.
Umatilla, McKay Dam.	McKay Dam, Oreg.....	R. M. Conner ⁴	C. B. Funk.....	W. S. Gillogly.....	H. L. Holgate.....	Portland, Oreg.
Yakima, Tieton Dam.	Rimrock, Wash.....	Walter Ward ³	V. G. Evans.....	C. F. Williams.....	do.....	Do.

¹ Project operated by Salt River Valley Water Users' Association.

² General Superintendent and Chief Engineer.
³ Construction Engineer

⁴ Superintendent of Construction.

The NEW RECLAMATION ERA is issued every month by the Bureau of Reclamation of the Department of the Interior, Washington, D. C. It is printed by the Government Printing Office, Washington, D. C.

The NEW RECLAMATION ERA is sent regularly to all water users on the reclamation projects under the jurisdiction of the bureau who wish to receive the magazine. To other than water users the subscription price is 75 cents per year, payable in advance. Subscriptions should be sent to the Chief Clerk, Bureau of Reclamation, Washington, D. C., and remittance in the form of postal money order or New York draft should be made payable to the Chief Disbursing Clerk, Department of the Interior. Postage stamps are not acceptable in payment of subscription.

OUR forests may be cut and our mines dug up, but the reclamation of an area adds to the productive wealth of the Nation for all time. It is estimated that by the year 1950, only 25 years hence, the population of our country will be 150,000,000 people; and it is absolutely necessary that we add to the farm producing qualities of our lands in order that we may feed this additional 40,000,000 mouths.

With irrigation comes electrical power, and we must develop power in connection with irrigation in order that the farmer and his family on a project may have power to operate his machinery, and the housewife the conveniences to relieve the excess burden. With the improvement of conditions in Europe will come the greatest immigration in history to this great Northwest, and we should be ready to meet it and take care of it as it comes.

*From address by James M. Kyle, of Stanfield, Oreg.,
at the Oregon Irrigation Congress, September 8, 1924.*

NEW RECLAMATION ERA

VOL. 15

DECEMBER, 1924

NO. 12



Photo by Army Air Service.

AN AEROPLANE VIEW OF ARROWROCK DAM, TOWERING 349 FEET ON THE BOISE RIVER, IDAHO

MAKE THIS DIAGRAM of AMERICAN AGRICULTURE

DRAW THREE CIRCLES, one outside the other. Let the second one be a little larger than the first and the third one a little larger still. Now you have three areas. The center area represents, say, that six-tenths of all farming that is solid, that pays, that is consistently successful by reason of good method. This is not a geographical area, remember; it is diagrammatic only. Within it, belonging to the successful six-tenths, there is every kind of farming in all parts of the country. There are dairy farmers who work every day in the year, general farmers who gamble with the Lord for moisture, wet farmers who get their water from irrigation ditches, fruit farmers, sugar-beet farmers, bean farmers, potato farmers, hay farmers, on both irrigated and unirrigated land, and dry farmers who work only ninety or a hundred days for a wheat crop and spend their winters in Florida—each according to his skill and disposition. The point is that any kind of farming can be made to pay; most of it does.

The next area, lying between the first and second circles, contains that one-fifth of all farming that is liable to misfortune. It is sometimes bankrupt, sometimes rich, never quite safe, either up or down, as the natural and economic hazards run for or against agriculture.

The third zone contains that one-fifth of all farming that is marginal. By marginal one means on the fringe. It is inefficient; its costs are high; it is almost never prosperous. In very good times it lives and spends; in hard times it demands relief. Its chief function is to produce the surplus at a loss.

With this diagram in mind, agriculture as you see it will be easier to understand.

—From an article by Garet Garrett, printed in
The Saturday Evening Post of November 8, 1924

NEW RECLAMATION ERA

Issued monthly by the Bureau of Reclamation, Department of the Interior, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 15

DECEMBER, 1924

No. 12

ECONOMIC INVESTIGATION OF SPANISH SPRINGS PROJECT

Committee of experts points out that 50 acres comprises the most desirable farm unit, intensively farmed on basis of dairying, cantaloupes, poultry, and a variety of other cash crops

CONCLUSIONS AND RECOMMENDATIONS

IRRIGABLE area; soils.—The soils of the Spanish Springs project, Nevada, recommended for irrigation development are largely bench lands, lying in seven distinct compact bodies, elevated several feet above the Truckee River. The land in each of these areas has been divided so far as possible into three classes on the basis of a field examination supplemented by the detailed classification made by Hawley in 1912. The difference between the first two classes is largely a matter of cost of preparation for irrigation, while the third class is not recommended for irrigation, because of various unfavorable conditions. The lands recommended for development are uniform in quality, having a fairly uniform topography, and contain little or no alkali. The lands are on the whole of a higher grade than those now under irrigation in this region. There are in the irrigable area 46,096 acres of land from which deductions have been made for lands under the Indian canal amounting to 2,659 acres, private lands with possessory claims which have been validated amounting to 1,448 acres, and land to be allotted to the Indians under act of Congress of April 21, 1904, amounting to 2,635 acres. The irrigable area is thus reduced to a little more than 39,350 acres. In addition to these lands, there are approximately 7,500 acres of land under water contract in the Newlands project requiring supplemental water from the Truckee River, bringing the total area to be provided with water from the Truckee River to 46,850 acres, 65 per cent of which is first-class land and 35 per cent of which is second-class land. It is estimated that it will cost \$40 per acre to level and prepare for irrigation the first-class lands, while second-class lands will require about \$60 per acre.

These lands are located very favorably in regard to drainage. Costs for ultimate drainage will be low in comparison with other projects, and it has been estimated that the drainage costs will approximate

LOCAL INDORSEMENT

Reno, Nev., October 30, 1924.

Mr. David Weeks,

Agricultural Hall, Berkeley, Calif.

Dear Mr. Weeks: Your committee of bankers and business men appointed by Governor J. G. Scrugham, have studied the report of special committee to the United States Bureau of Reclamation, Department of the Interior, on agricultural and economic development of lands adjacent to the Newlands reclamation project under the proposed Spanish Springs storage reservoir, and beg leave to report as follows:

We have studied said report and find that it covers the situation thoroughly, and unanimously approve the same with the following four suggestions:

1. Raw lands, without water should be purchased at from \$10 to \$15 per acre.

2. Dairying, poultry raising, and diversified farming, producing crops which will command a ready cash market, are recommended.

3. Farm units should be small and settlers selected who have a capital of from \$1,500 to \$2,500, and who should be encouraged by additional financial assistance as the Government may provide and at a reasonable rate of interest.

4. The Spanish Springs project is feasible and attractive to settlers. The Government should receive back the construction cost in a reasonable period of years under the plan providing for 5 per cent of the gross annual return to be collected and applied to construction costs.

Very truly yours,

J. SHEEHAN.

GEO. WINGFIELD.

W. H. SIMMONS.

W. J. HARRIS.

W. A. SHOCKLEY.

an average of \$5 per acre. This does not take into consideration lands under the Indian canal, which will undoubtedly be seeped to some considerable extent by the construction of this project. The costs of draining these Indian lands have not been considered in estimates included in this report. An allowance of 10 per cent has been made in the land area recommended for the farm unit for lands that may be or may become unproductive.

Estimated acre costs for construction.—Storage development to the extent of 100,000 acre-feet at Spanish Springs and necessary distribution systems would involve an expenditure of approximately \$122 per acre. Limiting the storage to this capacity would mean a curtailment in total acreage. The extent of this reduction in area can not be determined without further analysis. Whether it will be more economical to increase storage capacity at Spanish Springs at a higher acre cost or cut down the acreage under the Newlands project depends upon two undetermined factors. One of these is the area feasible of irrigation under the existing Newlands project and the other is the probable cost of storage necessary to provide adequate regulation for that area and the additional area proposed to be brought under irrigation.

Operation and maintenance costs.—Costs of operating and maintaining the irrigation system in the Newlands project is now about \$2 per acre per year. This cost will be changed but little by the increase in area. Savings because of the greater area will be offset by greater costs of operating canals carrying more nearly their full capacity.

The problem of securing settlers.—Under present conditions and present available credit facilities, settlers probably could not be secured in sufficient numbers to settle upon the lands of this project who have funds needed for carrying out the necessary agricultural development for bringing their farms to full

(Continued on page 182)

FINANCIAL REQUIREMENTS UNDER VARIOUS PLANS

Different situations which the prospective settler might be required to meet are outlined, showing that successful development depends largely upon approval of the Fact Finders recommendations

(Continued from page 181.)

production in a reasonable period. This statement is based upon experience in this locality and in other parts of the irrigated region.

The amount of costs settlers can stand on fully developed farms.—Allowing for water deficiencies, pests, a certain amount of reduction in prices, and other contingencies, it is estimated that the average settler will probably be able to pay on the fully developed farm \$915 per year for interest and repayment of capital borrowed for agricultural development and construction.

Financial requirements under various plans of development.—Estimates of financial requirements have been made on the basis of acre costs, amounting to \$120 for storage and distribution works, \$10 for domestic water supply, and \$10 for land. Since these estimates have been made, a study of the available water supply indicates the possibility of increased acre costs depending upon the extent to which land area is reserved for development under the Lahontan Reservoir. Acre costs may also be increased by administrative overhead, which has not been included. The following estimates are given for the purpose of indicating to what extent and under what conditions increased acre costs would be feasible:

FINANCIAL REQUIREMENTS FOR THE DEVELOPMENT OF THE 50-ACRE FARM. THE SETTLER MOVES ONTO THE FARM IN ITS RAW CONDITION, UNLEVELED, WITHOUT IRRIGATION, LATERALS, BUILDINGS, OR FENCES

(a) If the farmer must avail himself of existing credit agencies and provisions of the reclamation act now in force as it applies to homestead lands, with no plan of financing agricultural development, his total financial requirement the first six years in excess of his income will be approximately \$7,500 for all expenditures for living, operation, and development, while the requirement for the two construction payments during this period will amount to \$700 more. He may, if he has \$5,000, be able to borrow at 8 per cent interest sufficient capital to make up the balance. If he does not have \$5,000 he must have a family capable of operating and developing the farm while he devotes his entire time to outside labor. Settlers with this capital requirement or with the type of family necessary for carrying out this program are not

available in sufficient numbers to settle the lands of the Spanish Springs project.

(b) If the recommendation of the Fact Finding Commission becomes effective for repayment of construction costs on the basis of 5 per cent of the gross income, this feature alone would only reduce the capital requirement by approximately \$290.

(c) If the recommendation of the Fact Finding Commission becomes effective, which provides long-term credit at a low rate of interest for agricultural development, the advantage becomes more pronounced. Below is a tabulation illustrating the importance of this feature of their report as applied to the Spanish Springs project. Higher rates of interest are given for comparison:

Capital of settler	Rate of interest	Additional requirement	Years required to amortize development debt	Years required to amortize construction debt
\$1,500.....	4	\$7,490	19	58
\$1,500.....	5	7,790	20	58
\$1,500.....	6	8,090	23	58
\$1,500.....	8	8,720	34	58

FINANCIAL REQUIREMENTS FOR THE DEVELOPMENT OF THE 50-ACRE FARM UPON WHICH THE SETTLER MOVES AFTER THE LAND HAS BEEN LEVELED AND LATERALS CONSTRUCTED, THE COST OF THIS EXTRA WORK BEING INCLUDED IN THE CONSTRUCTION COST

(a) If the farmer must avail himself of existing credit facilities and provisions of the reclamation act as it now applies to homestead lands, with no plan of financing agricultural development, he must have available \$7,168 for agricultural development and construction payments during the first six years. He may be able to borrow all but \$4,000 of this at 8 per cent interest. His situation is somewhat improved over that of the farmer coming on the raw land under similar circumstances. Both situations are impossible under present conditions.

(b) If he can pay for construction costs at the rate of 5 per cent of the gross income, his situation is improved but little.

(c) If he can borrow money at a low rate of interest in amounts sufficient to meet his needs and pay construction and land leveling at the rate of 5 per cent of gross income, his situation is greatly

improved. The following tabular statement illustrates what can be accomplished under these circumstances:

Capital of settler	Rate of interest	Additional requirements	Years required to amortize development debt	Years required to amortize construction debt
\$1,500.....	4	\$6,706	19	75
\$1,500.....	5	7,095	19	75
\$1,500.....	6	7,395	21	75
\$1,500.....	8	8,021	28	75

FINANCIAL REQUIREMENTS FOR THE DEVELOPMENT OF THE 50-ACRE FARM UPON WHICH THE SETTLER MOVES AFTER THE LAND HAS BEEN LEVELED AND 20 ACRES OF ALFALFA PLANTED PRIOR TO THE ARRIVAL OF THE SETTLER, THE COST OF WHICH IS ADDED TO THE CONSTRUCTION CHARGE

(a) If the farmer must avail himself of existing credit agencies and present provisions of the reclamation act, with no plan for financing agricultural development, he must have \$2,500 in cash or equivalent and must expect to borrow \$1,700 in addition at 8 per cent interest to equip his farm.

(b) Payment of construction costs at the rate of 5 per cent of gross income will change these figures but little.

(c) If construction costs are paid at the rate of 5 per cent of the gross income, and long-term credit provided for agricultural development, the advantage is very great. This advantage is shown in the following tabulation:

Capital of settler	Rate of interest	Additional requirements	Years required to amortize development debt	Years required to amortize construction debt
\$1,500.....	4	\$3,600	12	82
\$1,500.....	5	3,870	12	82
\$1,500.....	6	4,140	13	82
\$1,500.....	8	4,610	15	82

Effect of increased acre costs.—By increasing the time of repayment of development debt to 34 years, an additional acre cost of \$60 could be amortized if land is not leveled, whereas if land is leveled and 20 acres of alfalfa planted, an additional acre cost of \$110 would be feasible. In each case it is assumed that money for agricultural development is available at 5 per cent interest and that

construction costs are amortized on the basis of 5 per cent of the gross income. It is further assumed that cost of leveling of land in the second instance is included in the construction cost.

Size of farm units.—The most desirable farm unit has been determined at 50 acres.

Character of agriculture.—Conditions of climate and soil on the proposed project will permit the production of a considerable variety of agricultural crops, including small grains, corn and sunflowers for silage, alfalfa, the clovers and grass pasture, potatoes, onions, cantaloupes, the small fruits, and in all probability ultimately the orchard fruits. The market conditions governing the agriculture in this region, however, and the possibility of growing three crops of alfalfa make it apparent that the success of the project must be based very largely upon the development of the dairy industry, supplemented by home flocks of poultry, a few hogs, and the raising of potatoes and cantaloupes on a small scale as an immediate cash crop.

Land values.—The Southern Pacific Railway Co. has placed a value on 17,897 acres of land, part of which is within the Spanish Springs development, amounting to \$2.50 an acre for the entire tract. Of this acreage, 7,815 acres were included within the original proposed Spanish Springs development and about 4,000 acres were considered by the company as feasible for agricultural development. If \$2.50 an acre were paid for the tract, the total amount would be in the neighborhood of \$44,743, or an average of about \$18 per acre for the 4,000 acres susceptible of development into farms, considering the lands not suitable for irrigation as having no value. Irrigable land could be purchased from the railroad company at a price ranging from \$7.50 to \$20 an acre. Lands within the Indian reservation have been priced at varying amounts, the common opinion as to value of land on this reservation being in the neighborhood of \$6 an acre. Conservative bank appraisals within the Newlands project have ranged around \$150 per acre for developed farms not subject to severe alkali and drainage conditions. This does not include the cost of buildings.

Recommendations.—The foregoing conclusions make possible recommendations as follows:

(a) The area of land suitable for irrigation under the Lahontan Reservoir must be established before feasibility of the project as a whole can be determined.

(b) Estimates of cost for storage and distribution on the basis of ultimate land area under Lahontan Reservoir and new

development under the Spanish Springs Reservoir should be made.

(c) A financial plan should be instituted by the Government to provide funds at a

The lands recommended for development are uniform in quality, fairly uniform in topography, and contain little or no alkali. The net irrigable area of 39,350 acres on the whole is of a higher grade than lands under irrigation in this region. They are located favorably in regard to drainage. They will require greater quantities of water than the lower lying lands, but the acre yields will on the average be higher.

The question of the availability of a water supply for the Spanish Springs project is a part of the general program of the complicated water and power rights upon the Truckee. There are other engineering and legal problems requiring solution involving the location for storage, the withdrawal of water for the Indian lands of Pyramid Lake, and allied subjects. These problems are complex, their solution will require expert knowledge of engineering and the law, and after thoughtful examination it seems proper that they be passed upon by men of special training in these fields.

Operation and maintenance costs will approximate \$2 per acre per year.

Settlers having sufficient funds for developing these lands will probably not be available under present conditions and with existing credit facilities.

It is estimated that the fully developed farm of 50 acres will make available annually \$915 for principal and interest on money borrowed for agricultural development and construction.

Settlers with \$5,000 and with existing credit facilities could probably meet the costs of development and operation of their farms and costs of construction to the Government.

Settlers having \$1,500 would be able, if capital were provided at a low rate of interest, to meet principal and interest payments on a construction, overhead, and land cost of \$200 per acre and on additional funds borrowed at 5 per cent interest for agricultural developments, provided the amount borrowed for development is amortized over 34 years and construction costs are repaid on the basis of 5 per cent of the gross income. If lands are leveled by the Government and the expense thereof is included in the construction cost and if 20 acres of alfalfa are planted before the arrival of the settler, then an acre cost for construction, overhead, and land of \$250 could be paid.

The successful development of the project will depend upon the 50-acre farm unit intensively farmed on the basis of dairying, cantaloupes, and poultry, and a variety of other cash crops.

Respectfully submitted.

DAVID WEEKS.
ROBERT STEWART.
S. B. DOTEN.
CECIL W. CREEL.
F. B. HEADLEY.

low rate of interest, with long-term amortization of principal, for agricultural development and payment of construction costs and land.

(d) Agricultural development should be carried out under supervision of the Government, represented by an expert agricultural advisor trained in the execution of problems confronting the settlers on new projects.

(e) The Government should fix prices of land to prevent speculation and, if possible, lands should be purchased outright by the Government and sold to bona fide settlers.

(f) Settlers should be selected on the basis of their ability to farm, and each settler should have a certain amount of capital which will depend upon the exact terms of the financial plan and the amount that settlers will have who are available in sufficient numbers.

(g) A program of development and capital requirements should be prepared on the basis of which funds should be advanced by the Government.

(h) An agricultural program agreeable to the farmer and the Government should set forth a schedule of land utilization, livestock and farming methods with expected yields and income, and a schedule of repayment.

(i) For a number of years contracts between the Government and settlers should be unassignable, except with the approval of the Government, in order to prevent settlement on this project by men whose sole purpose is to gain by the speculative rise in price of land.

Respectfully submitted.

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ROBERT STEWART,
Dean, College of Agriculture,
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More than 8,000,000 cattle throughout the country are now under supervision for the eradication of tuberculosis.

Herds of dairy cattle in many parts of the country are being improved at a minimum of cost for high-class sires through the medium of bull associations.

PROJECT ANNUAL AGRICULTURAL CENSUS, 1924

Regulations for taking the crop and livestock census in cooperation with the Bureau of the Census, on the Federal Reclamation projects for the year ending December 31, 1924

PLAN of taking census.—The regular crop and livestock census covering the agricultural operations for the calendar year 1924 and the agricultural census usually taken by the Bureau of the Census will be taken on Federal reclamation projects simultaneously this year. The enumerations will thus be made at the one time. This plan has been approved by both of the cooperating agencies. It will not only save the farmer's time but will effect a considerable saving to the Government.

Employees used.—The Bureau of the Census will appoint one or more employees of the Bureau of Reclamation on each project as its agent, or agents, who will supervise the taking of the census and who shall appoint the necessary enumerators. The agent or supervisor, and likewise the enumerators, being employees of the Bureau of Reclamation, will serve without additional compensation. The Bureau of the Census will reimburse the Bureau of Reclamation at the regular rate for making such enumerations and each project will be credited accordingly.

Census forms.—The record forms to be used by the enumerators will be the usual Bureau of Reclamation Form No. 7-332 and a supplemental form (7-332 a) which will contain information respecting the annual fixed charges a farmer is required to pay. This is a new form and will give the bureau information as to how much interest and principal, taxes, insurance, and water charges become due each year. The bureau should have knowledge of these facts in order to understand the burden under which the farmer operates. The Department of Commerce, Bureau of the Census Farm Schedule, 1925, Form No. 10-1, shall be used to obtain the information for the Bureau of the Census. Full instructions in regard to this form will be sent by the Bureau of the Census to the supervisors with the supply of forms.

Accurate records.—The Bureau of Reclamation requires an accurate survey of the crop returns and livestock inventories and the fixed charges on each project, and this can only be secured provided the records taken on each farm are reliable. This will in some cases be difficult to obtain. Absentee owners and other conditions will necessitate the enumerator using good judgment based on the best information obtainable. He will seek the farmer's cooperation to arrive at the most accurate results. Not all the crops grown in 1924 will have been harvested and sold when

the enumerations are made, and a fair estimate of areas, yields, and values of such crops will have to be established. The enumerator will estimate such areas, yields, and values with the assistance of the owner, occupant, or tenant of the farm under consideration and record such estimates on the forms provided. Form No. 7-332 should be dated and signed, as heretofore, by the owner, occupant, or tenant and in addition should be countersigned by the enumerator.

Review committee.—In order that a fair and true condition shall be reflected in the final records, a review committee shall be appointed or selected, consisting of three members. One member shall be a water user selected by the governing body of the water users; one shall be an employee of the Bureau of Reclamation (not the supervisor of the census nor an enumerator), who shall be appointed by the project superintendent, and these two members shall choose a third member, preferably a local banker. It shall be the duty of this committee to convene at definite times and places as a board to review individual records which are in question. The time and place of their meetings shall be published in one or more papers of general circulation throughout the community. Any water user shall have the privilege of presenting to such committee at one of its meetings data relative to the records taken on his or her farm, at which meeting the views of the enumerator should also be presented, and the committee, after considering such data, may amend the record by a majority of the committee agreeing to do so. This committee will deal only with that part of the census which refers to crop areas, yields, and values.

DR. MEAD WRITES FOR COUNTRY GENTLEMAN

Dr. Elwood Mead, Commissioner of the Bureau of Reclamation, has written a series of three articles on the general subject of "The Future of Reclamation," which will appear in consecutive issues of the *Country Gentleman*, the first article being printed in the issue of November 29, 1924. The articles give a brief history of Federal efforts at reclamation in the past and a comprehensive description of plans for successful future development.

Duties of supervisor.—The supervisor of the census shall appoint and supervise the enumerators and finally prepare, or have prepared under his direction, the necessary summaries of the data collected. He shall also fix in general the unit prices of the various products.

Duties of enumerator.—The enumerator shall collect, record, and transmit to the supervisor the necessary data for the Bureau of Reclamation and the Bureau of the Census.

Crop census.—The crop census shall show, with respect to each farm, the number of acres of various crops grown thereon, the yields per acre, and the values of such crops, and supplemental data, whether such crops were sold, fed, or are still on hand.

How to value.—Many farmers will not have sold their crops; then the enumerator shall place a value upon such crops in accordance with the unit prices as fixed in general by the supervisor; others will have fed hay and grain to livestock and the value of such crops shall be determined as if the crops had been sold and not fed to livestock. Hay, fodder, or other harvested forage should be valued in the stack on the farm. Crops, such as grain, beans, seeds, etc., including fruits and vegetables, shall be valued f. o. b. cars, shipping point, exclusive of the cost of containers. All factory crops, such as sugar beets, tomatoes, etc., shall be valued at the selling price (including estimated bonuses) f. o. b. shipping point when not delivered direct to the factory. Grain crops which were not harvested for hay or grain should be included as pasture. A distinction should be made in value between tame and wild irrigated pasture and the value should be a reasonable annual rental for such pasture. Straw, sugar-beet tops, hay and grain stubble, etc., and other by-products should be listed and valued. All gardens and miscellaneous crops should be listed and valued.

Information to water users.—The supervisors, enumerators, and review committees shall make the above information available to water users in order that all will have a clear understanding of the methods of taking the census for the year 1924.

During the past fiscal year the Bureau of Reclamation sold 172,377 publications and maps, the receipts from which amounted to \$6,919.

CONTROL OF SANDY SOILS ON THE UMATILLA PROJECT

H. M. Schilling, superintendent of the Umatilla irrigation project, Oregon, tells how the problems of the sandy soils should be met to obtain the best results

ON THE Umatilla project in Oregon, where sandy soils predominate, the first principle, learned through years of experience, is not to disturb the original conditions and natural vegetation until such time as the lands can be properly taken care of. One of the great errors of the past has been the indiscriminate clearing of large tracts and the inability to put them into cultivation.

After a tract has been carefully inspected and laid out with a view to leveling and irrigation, clearing should if possible, be begun on the windward side. Border irrigation with fairly large heads has been found to be most efficient. When the land has been prepared, a cover crop is usually necessary and rye has been found to be most suitable. If given sufficient moisture the plants will survive, unless completely covered or almost blown out by the roots. Rye can be grown in colder, more exposed places as it germinates quickly and will grow at temperatures a few degrees above freezing when other grains would be virtually at a standstill, and it will thrive on soils of lower fertility than other grains.

To prevent soil movement by wind a method which has been found successful is that of covering with straw at the rate of one-half to three-quarters ton to an acre, which is about as thin as it can be spread. The straw is disked into the soil with a disk harrow with the disks set straight. The disked-in straw prevents the strong winds from reaching the soil and moving it before the cover crop has become well established. The constant rasping action of the wind in moving the loose dry grains during heavy winds soon cuts off the young plants at or near the surface of the ground.

The mistake should not be made of clearing and piling brush in windrows, as the windrows then cause barriers of sand which later must be leveled, thereby adding additional expense. Brush barriers, however, have their proper use. On the west division main canal, good use has been made of them in holding sand from drifting on the right of way until natural vegetation started again.

Trees form very efficient windbreaks and add to the appearance of the community. Poplars and locusts grow quickly and can be cut when the more permanent varieties are interplanted and attain growth.

The distribution system of the Umatilla project is nearly all concrete lined or in pipelines. This conserves water as well as decreases the cost of maintenance.

Where sand blows occur, directly threatening the capacity of canals or laterals, the sand has to be removed either by teamwork or if suitable facilities can be provided, by sluicing. Approximately 40,000 cubic yards of sand have been moved by sluicing from the main canal on the west division at a very low cost. Three permanent sluiceways have been provided and in the nonirrigation season one man operating a sluiceway with a small head of water can efficiently clean four or five miles of the canal.

Control of sandy soils may be summarized as follows: Most important of

all in either construction or cultivation, do not disturb natural vegetation until ready to work, and do not open up, clear, or level land until ready to follow up with seed or cover crop. Clear on the windward side if possible; and give careful attention to irrigation, both as to frequency and application. Plant windbreaks (quick-growing trees) as soon as practicable.

Bulletin No. 177 of the Oregon Agricultural College Experiment Station on the management of sandy soils under irrigation, by H. K. Dean, contains a large amount of valuable data on this subject.



Salt River project dates

FACT FINDERS REPORT REVIEWED BY SOUTH AFRICANS

Report of the Committee of Special Advisers on Reclamation, appointed by the Secretary of the Interior, discussed in South African Irrigation Magazine

THE following extracts are from a review of the report of the Committee of Special Advisers on Reclamation printed in the September issue of the South African Irrigation Magazine:

"The reclamation act was built on the assumption that the construction of irrigation works would create irrigated agriculture. A fundamental error was made in this assumption."

"This is the keynote of the whole report. America has been very slow in discovering that the fundamental error was in the act."

"The fundamental error in the act arose from overlooking the following points:

"1. Settlers do not flock to irrigation schemes.

"2. Irrigated farming is a science which requires experience or training.

"3. Irrigated farming requires capital.

"4. Irrigated farming requires good understanding of markets and directed or cooperative effort in production and marketing.

"Other matters, such as varying the rates to suit lands of different productive capacity, management of the concerns by the settlers themselves, excessive costs of construction, etc., are dealt with in the report, but there is no doubt that the above four points are the basis of the fundamental error.

"Now, what are the remedies suggested by the commission?

"As to 1, not much is said in the report and we can not understand this. Every private settlement business has a branch concerned with the securing of settlers rapidly, which requires organization and money to carry out the work properly.

"As to 2, advice must be given in every possible way. Training schools do not seem to have received consideration. Research and demonstration farms are necessary and require money.

"As to 3, it is pointed out that the farms must be prepared for the settler and money for development must be provided and its expenditure must be watched. A credit fund is recommended. Loans for development should be made part of the reclamation policy.

"It will be noted that all the additional functions require additional staff and funds, and the conditions on which the funds are loaned are very lightly touched upon. The importance of these conditions will be realized from the Australian experience.

"If the recommendations be given effect to, the Government will embark on a

great paternal venture in settlement, involving considerable expenditure. The questions of any limits to such expenditure, of how much of this capital is to be recovered from the settlers, and in what way, are not dealt with in detail. However, the need and justification for such paternalism are well established.

"If we could concentrate the main trend of the report into a few words, we would do so as follows:

"1. Irrigation is a work of national necessity, and although difficulties have been experienced, success in a wide sense is assured eventually.

"2. Legislation was faulty in assuming that all the Government had to do was to construct the works and successful settlement would follow. The laws require to be amended to widen the functions of Federal irrigation to include securing and selection of settlers, and assistance to them in work, advice, and money advances.

"3. Legislation must also provide for the necessary funds and organization and in this connection the division of the work into the three main groups of engineering, settlement, and finance is essential, and equally essential is the single control and coordination of all the functions in irrigated areas."

"The reorganization of the department required in order to carry out the recommendations is dealt with in only two pages. This seems very extraordinary in view of the wide activities which have to be coordinated. The essential part of the recommendation is, however, that there should be three branches of irrigation work, instead of the old one, and that these three branches should be under the direction of a single commissioner.

"The branches are engineering, finance, and farm economics (including settlement). However the details may be worked out, there is no question that this creation of three such branches under a single control is absolutely sound. It is what Australia found to be necessary many years ago and recognizes the wider aspects of irrigation. The single business control (as apart from ministerial control) is absolutely essential. To have expected three or more separate departments to work efficiently in an irrigated area without any other control than that which can be exercised by ministers would have been absurd.

"The American report recommends a single commissioner to exercise this single

control. There is no doubt that a single individual in control is an ideal, but, we are tempted to add, in a world rather better than it is at present. That single individual will have a dog's life and we wonder how frequently the post will be filled in the next dozen years. When Federal money is available to be spent, he will be incessantly worried with too much kindness, and when it has to be recovered, he will be equally worried with too much abuse.

"What the new department will have to do is not, as in the past, to construct and maintain the work and collect the rates only. It will have to study agricultural and economic features of new schemes, secure settlers, choose those with proper experience or see that they get experience or guidance, prepare the plot by clearing and leveling the land, building furrows, houses, and fences; advance money for development; instruct and demonstrate in suitable farming methods and carry out research; help in marketing and transport arrangements; provide for township and social welfare generally; and recover rates and advances of all sorts. This has to be done for a number of schemes all over the country. The central organization is well provided for, but when the field organization comes to be worked out and the correlation of the different branches of activity in the field and with the central control, there will be some difficult problems to solve and it will be interesting to see how the American genius for organization will solve them.

"Our problems are much smaller, but even more intricate for these (amongst other) reasons: Private ownership of land is more in evidence, our works are more expensive, interest is charged on moneys expended, and our irrigation law is less progressive, and we already have four separate bodies working in irrigation areas—irrigation, lands, land bank, and agriculture. However, anyone who knows the conditions intimately in this country in reading the report would imagine that many of the pages were written of conditions in South Africa and conversely much of what has been written of South African conditions can be found in the report.

"The optimistic note of the report should not be lost sight of in the host of recommendations. It is stated that there is no doubt about the successful outcome of the Federal experiment in irrigation, if the experience now gained is applied to the existing and coming projects."

THE SUGAR-BEET INDUSTRY ON THE MINIDOKA PROJECT

E. B. Darlington, superintendent of the project, describes some of the processes used in handling and loading this valuable cash crop, grown this year on about 12,500 acres

PRODUCTION of sugar beets is an important factor in the agriculture of the Minidoka project, Idaho. In 1923, 11 per cent of the cultivated area was cropped to beets and in 1924 about 13 per cent, equivalent to approximately 12,500 acres. Close to 17,000 acres were signed up for the Burley and Paul factories in 1924, but owing to poor germination and ravages of insect pests, many seeded fields were plowed up and planted to other crops.

October is the harvest month. For several weeks the fields are full of diggers, toppers, and loaders; and project roads are lined with teams hauling the beets to the factories or to the loading stations at railroad sidings. Most of the dumps on the Minidoka project are equipped with mechanical loaders, actuated by electricity, and a brief description of the processes involved in transferring the crop from wagons to cars may be interesting.

In the field the beets are piled and with forks loaded upon wagons carrying large boxes specially designed for beet hauling. The ends of the wagon bed are stationary but the sides are hinged, so that they may be dropped down when the box is emptied. The box is also hinged to the bolsters and so built that the entire bed can be tipped to an angle of about 45 degrees.

A large proportion of the highways on the project are gravelled and it is possible to haul heavy loads over them. When drawn by two horses the wagons are loaded with 3 or 4 tons; four horses will pull 6 tons. At the Rupert dump one load having a gross weight of 16,260 pounds was received this past fall. It was hauled 4 miles by four horses.

After the beets are weighed they are hauled up an incline and the wagon is



Farmyard storage of sugar beets

blocked upon a platform opposite the dumping hopper. A side gate is dropped to allow the beets to roll out. A chain hooked to a sheave running on a steel cable is attached to one side of the box and another chain prevents the box from tipping too far. At a sign the hoist is started and the wagon bed gradually tipped until the beets slide out into the hopper. At the same time an endless-belt conveyor is started and removes the contents of the hopper at a rate that may be controlled by a gate at one end. Beets, dirt, and any other extraneous material that may have been shovelled into the wagon are elevated to a tower containing a grizzly or large rotating screen on an incline, and as the beets are rolled around and pass through they are separated from the loose dirt, which falls into a trap. From the grizzly the beets are chuted upon another belt conveyor and carried

directly to a car spotted on the sidetrack below.

The hoist, conveyors, grizzly, and trap are operated by a 15-horsepower motor, and the inside of the tower is lighted by incandescent lamps. A carload, containing 55 tons, can be loaded in 45 minutes if the beets come to the dump fast enough, but as there is often a considerable interval between wagonloads, from three to five carloads a day is the usual average.

After the beets are off the wagon the team is driven underneath the tower and the wagon stopped below the dirt trap. The gate of the trap is then tripped and all the loose dirt from the load dumped into the hopper is dropped into the wagon box. This dirt is weighed as the wagon again passes over the platform scales, the weight of the dirt deducted, and the teamster given a ticket for the net weight of his load.

(Continued on page 188)



Dumping sugar beets by electric hoist, and loading them into cars by means of a belt conveyor

PROJECT DAIRYMEN'S MUTUAL LOAN ASSOCIATION

This association, organized on the Lower Yellowstone project, Montana-North Dakota, in 1921, has improved the stock and increased the number of dairy cows by 150 head

A DAIRYMEN'S mutual loan association was organized on the Lower Yellowstone project, Montana-North Dakota, on September 13, 1921, having for its object the accumulation of a fund to be invested in loans to its members only. Such loans to be for the sole purpose of enabling its members to purchase live-stock for dairy purposes. The fund is administered by a board of trustees under surety company bond. The trustees regulate the terms and conditions upon which stock in the association is issued or canceled; also the terms, conditions, and securities upon which loans are made or canceled.

The stock of this association is divided into three classes, namely: Class A, or savings stock; class B, or loan stock; and class C, or paid-up stock. Payments on class A stock may be made monthly and continued until the amount paid in, together with the dividends earned, amounts to the par value of the stock, at which time the owner is entitled to receive the amount of such stock in cash. Payments on class B stock are made monthly. Class C stock is paid for in full at the time certificate of such stock is issued.

Subscribers for class A stock are entitled to transfer their credits to class B stock and become borrowing members, provided further, however, that borrowing members must pay at the rate of not less than \$2 per month on each share of stock borrowed on. Certificates of class C stock may be issued to any member whose class A stock has matured by payments and dividends.

Each borrowing member pays to the association monthly as dues on stock at the rate of not less than \$2 per month on each \$100 of his loan, which is applied toward the payment of the member's stock subscription. These payments as dues are continued until such stock by reason of these payments and the dividends declared thereon is fully paid up. In addition to the above each member pays to the association as interest at the rate of not less than 66 $\frac{2}{3}$ cents per month on each \$100 of his loan.

The borrowing member executes and delivers to the association a chattel mortgage, which in effect provides that the association has the right to make inspections of livestock as often and in such manner as its trustees may desire,

and gives the association absolute power to take from a borrowing member any livestock which may be security for a loan, should the borrowing member fail to make the necessary payments, or to care for the livestock in a way satisfactory to the officers of the association. The chattel mortgage also authorizes the association to require livestock insurance.

Sixty-five full-blood Holstein cows and five bulls have been purchased by the association and distributed to its members. It is estimated that with the increase from these cattle, the cow population of the project has been increased by at least 150 head. In addition to this, the quality of grade stock on the project is being improved through the use of association bulls. Results are being shown by practically doubling the cream products each year.

No action has yet been taken by the association toward establishing creameries or cheese factories. The producers have, however, formed a marketing association in which all of the cream is pooled and daily quotations obtained from various agencies buying cream, the day's supply going to the highest bidder. This results in appreciably better prices to the farmers.

AGRICULTURAL CREDIT CORPORATION

In this connection it is of interest to note that a committee of water users in the vicinity of Fairview has arranged to take advantage of the provisions of the Agricultural Credit Corporation. During September, 42 head of Guernsey cows were shipped in and distributed to the farmers, and arrangements have been made for the early purchase of about \$24,000 worth of sheep. These are to be distributed in small flocks, with a maximum limit of \$1,000 worth to any individual. Emil Johngaard of Fairview Mont., is secretary of the committee.

One of the trends of irrigation development in the United States is the rapidly increasing use of stored water to supplement the flow of streams after the spring floods subside.

It is estimated that fully 40 per cent of the available water supply of the western States has been utilized in the irrigation of about 20,000,000 acres.

MINIDOKA PROJECT SUGAR BEETS

(Continued from page 187)

In addition to the deduction for loose dirt brought in with the load, the grower is charged a tare for the dried mud that clings to the beets after they pass through the grizzly. This is determined for each load by taking a basketful from the discharge end of the grizzly and weighing it. The dirt is then thoroughly cleaned off each beet in the basketful with brushes and the cleaned beets weighed again. The difference in weight is usually from 6 to 10 per cent of the gross, and this percentage is applied to arrive at the corrected net weight of the load.

Sometimes as much as 25 per cent of the total weight of a wagonload is dirt. This may amount to a ton or more that the grower hauls off the field and for which he receives no return. A story is told of one teamster who brought in a good-sized wagonload of beets without any trouble, but who got stuck when he tried to pull the dirt from his load away from the trap. That the spot under the tower was some-

what muddy was given little consideration by his joking neighbors.

For growers who live more than 3 miles from a beet dump it is customary for the sugar company to allow \$1 per ton additional to offset the extra expense of hauling and siloing. The latter procedure is resorted to when a field crew digs, tops, and piles beets faster than they can be hauled the longer distance to the dump. It is also advantageous to the sugar company in relieving congestion at the factories and because of some loss of weight through drying out of superficial moisture. As shown in the illustration, beets are hauled into the farmyard and piled into large heaps. The piles are often leveled off and covered with beet tops to check loss in moisture and prevent freezing, but in general the grower starts hauling soon after getting the beets out of the field. Even though this method requires extra handling of the beets, it is often economical because the hauling can be done at a time when other work connected with harvesting is not so pressing.

LAGUNA DAM REPAIR COST ONLY 0.4 PER CENT A YEAR

R. M. Priest, engineer on the Yuma project, Arizona-California, describes repairs to Laguna Dam necessitated by retrogression due to shortening of Colorado River channel

IN 1920 at the height of the summer flood, which reached a peak flow of 190,000 second-feet, the Colorado River cut across a large bend at a point 5 miles below Laguna Dam, on the Yuma project, Arizona-California. This cutoff shortened the distance by river between Yuma and the dam by some six miles. One of the characteristics of the Colorado River is to maintain a slope of 1.2 feet per mile between any two given points regardless of the distance; therefore when this shortening took place retrogression immediately started to regain its equilibrium. Since retrogression must cease at the toe of the dam, the accumulation of this lowering amounted to 7 feet in the water surface in the river at the toe of the dam in a period of three years. This caused a direct drop of the water off the apron or talus at the toe of the dam and since the dam is constructed on a sand foundation this overpour could not be allowed to continue in view of the fact that a large quantity of the talus or apron rock had been washed away and holes along the lower concrete core wall showed depths below the bottom of this wall. It was recommended by a board of consulting engineers to fill these holes and extend the talus for 95 feet downstream from the lower wall with the best rock procurable.

The original talus was but 50 feet in width. This same retrogression similarly affected the outlet of the sluiceways, and although these are in rock, it is of poor quality and is subjected to velocities as high as 30 feet per second during sluicing periods. Holes to a depth of 26 feet had developed just off the concrete aprons.

On account of the high velocities it was decided for the California sluiceway, which has a carrying capacity of about 22,000 second-feet, to make up concrete blocks of 2 cubic yards and weighing 4 tons each and place these in the sluiceway channel to an elevation equal to that of the concrete apron and extending downstream for a distance of 95 feet.

As the outlet of the Arizona sluiceway, being but one-third the size of the California sluiceway, is not subjected to as much punishment, it was believed that large rock would answer the purpose there. The repairs to the California sluiceway were made first; 730 blocks were cast and placed with an American hoist and derrick with a 60-foot boom. For the area that could not be covered with the derrick a class 30-B dragline was successfully used. The blocks were cast on standard flat cars using 60 collapsi-

ble forms with no bottoms, made up of 1 and 2 inch lumber. The forms were stripped the day after being poured and set up again. Twelve blocks were poured to a car, the cars being hauled to and from the mixing plant by an 18-ton Davenport locomotive. After curing for four days, they were lifted from the cars and placed in the sluiceway eliminating extra handling. No effort was made to place these blocks in a regular manner on account of the irregularity of the bottom and besides it is believed that the rough surface presented to the water will tend to break its force. The size of the blocks was 3 by 4 by 4½ feet; seven sacks of cement were used for each block. Stone was quarried and crushed at the mixing plant and sand was hauled in 12-cubic yard dump cars from Yuma by railroad. The blocks were handled by loops made from scrap cable, that had been worn out on dragline machines, cast in place in the block. A maximum of 50 blocks were cast in one day. These blocks have been in place for nearly a year and with the exception of some little settlement, which was expected, have proven very satisfactory. It might be added that the average annual sluicing is about 1,500 hours. This is done for 24 hours weekly, and during the period of repairs to the toe of the dam the sluiceway was open and the work done was subjected to what equaled a year's sluicing under normal conditions.

For repairs to the talus at the toe of the dam rock was procured from a quarry on the Arizona side as it is of much better quality than that on the California side of the dam. Railroad connection at the dam on the California side is by what is known as the Potholes branch of the Southern Pacific Railroad connecting with their main line at Yuma, Ariz., and all equipment and supplies for the work were hauled over this branch line with project equipment.

A standard gauge track connecting with this branch line was laid across the dam to the quarry on the Arizona side. The steam shovel had been moved across the river when a flood from the upper river caused by heavy rains reached greater volume than could be handled by the sluiceways; this necessitated the removal of the railroad track from the dam, and work was suspended for a week when the flood waters subsided and the track was relaid. A Marion model 60 steam shovel, two 18-ton Davenport locomotives, and twelve 12-cubic yard side dump cars were used in handling the rock. Two

three-car trains were used in hauling the rock to where it was used. After the cars were dumped the track was thrown out a few feet at a time and this process was continued until the full width of 95 feet from the lower core wall was reached. The throwing of the track was a difficult matter on account of the large rocks over which it had to be moved. A total of 33,700 cubic yards of rock was placed in this manner. Two shifts of eight hours were worked so as to complete the work in the shortest possible time.

The flowing prism of the dam had contracted to a length of 1,500 feet owing to the accumulation of debris which had silted in, and this length of crest was increased to 2,000 feet; excavation was made by a Bucyrus 30-B and P. & H. No. 206 draglines, requiring the excavation of 25,800 cubic yards of silted in debris. Two thousand linear feet of pavement 12 feet in width and 6 inches in thickness were laid along the lower core wall in an effort to cause the water leaving the dam to flow along the same plane as that of the river and prevent the tendency to scour out holes off this wall. In the laying of this pavement only the smaller material was removed to get the required thickness of concrete; all large stones were left in place and the concrete poured around them. This has proven satisfactory. Near the Arizona side of the dam, where the original paving of the face of the dam was made with large rock, a considerable amount of deterioration had taken place; this was repaired with concrete. The Arizona sluiceway channel retaining walls had become undermined in places requiring a considerable amount of concrete that was poured under water. In all, 532 cubic yards of concrete were poured in addition to the 1,460 cubic yards in the 2-yard blocks placed in the sluiceway.

The work done has been very satisfactory and it is surprising the small amount of filling in that will be necessary in consideration of the fact that the run of the quarry was used; no effort was made to pick the rock, as this would have been impracticable on account of the short time available to complete the job; furthermore, desirable rock for this class of work is hard to obtain in this vicinity and the equipment available was not suitable.

No previous repairs have been made to the dam after 15 years of service and the cost of the repairs made amount on an average to four-tenths of one per cent per year, upon the original cost, for maintenance; this is considered a very reasonable cost for a dam founded on sand.

CHEAP ELECTRICITY SERVES MINIDOKA WATER USERS

Nearly 1,100 farms on the "electric project" are supplied with electric energy, which cheaply and efficiently aids the farmer and his wife in their daily tasks

THE Minidoka irrigation project in southern Idaho is known as the "electric project." With power houses on Snake River and a network of transmission lines covering the irrigable area, electric service is available to well-nigh every citizen in town or country. The system now supplies energy to nearly 1,100 farms, or approximately half of all farms on the project, in addition to service furnished to the towns and villages. The story of electricity on the project is told in the following by E. B. Darlington, the project superintendent:

On the Minidoka project, electricity has become the servant of the farmer and the rural housewife. Through its help a great deal of the drudgery and fatigue of farm life are eliminated and the farm home becomes a place of comfort, convenience, and good cheer comparable to the city residence. The gloom of the long winter evenings is dispelled by the glow of incandescent lamps with which all the farm buildings may be equipped; and it is no longer necessary to carry a lantern from house to barn, to light a precarious path, for a powerful yard light mounted centrally on a pole illuminates the farmstead area. It is a remarkable sight which is presented at night to the traveler coming down the hills lying to the south of the Minidoka project. The farm lights are so numerous and bright that the entire project area has the appearance of an enormous city, and it is sometimes difficult to pick out the location of even such sizable towns as Burley and Rupert.

The Bureau of Reclamation operates a power house at Minidoka Dam having a present maximum capacity of 7,800 kilowatts and two small plants at American Falls having a total output of about 1,800 kilowatts. These central stations are connected by transmission lines and current is transmitted at a pressure of 30,000 volts. In summer the greater part of the energy is used in pumping water for irrigation, but the project commercial and domestic load is also handled. In the off-peak season a large block of surplus power is used for heating.

Rural service is furnished mainly by small stock companies, organized and incorporated as mutual power companies, 68 per cent of the connected farms being supplied in this way. Current is taken from the Government high-potential lines through substations at which it is transformed to 2,200 volts. A very low rate can be made to the rural organiza-

tions because of their assumption of the details of distribution. There are 20 of these mutual power companies, operating over 200 miles of line. Other farms are supplied by lines connected to the system serving the several towns on the project.

From October 1, 1923, to October 1, 1924, the rural power companies used 554,888 kilowatt hours of energy at a cost to them of \$11,902.86, or an average of a little over 2 cents per kilowatt hour. The maximum demand was 270 kilowatts, culminating in the month of December. The Unity Light & Power Co. is the largest rural electric organization on the project, operating 45 miles of line and supplying energy to 174 farms. The maximum use during December, 1923, was 15,600 kilowatt hours. The Rural Electric Co., operating near Rupert, has about 75 farms connected.

The uses of electricity on the farm are many and various. The most general use is for lighting, energy for that purpose being universally demanded wherever service has been obtained. The majority of housewives on connected farms use electric flatirons and washing machines. Many customers also use hot plates, grills, toasters, small motors for pumping stock water and grinding feed, vacuum cleaners, cooking ranges, water heaters, and air or space heaters. Farmers are adding more appliances and taking advantage of the conveniences that electricity affords as fast as they are financially able to buy the equipment.

Several farmers on the project have every modern convenience that the city affords, in addition to the satisfaction of rural life. A typical home of this kind is that of Carl Lipps, living about a half mile west of Rupert. He is a stockholder in the Rural Electric Co.

Mr. Lipps operates a dairy farm of 25 acres, upon which he keeps 32 head of stock. He is now milking 24 cows, most of which are Jerseys. The product of the dairy is sold in Rupert, where Mr. Lipps owns a milk route. His land, stock, and improvements represent an investment of about \$11,000.

The Lipps family lives in a handsome, modern home, conveniently arranged and outfitted with many labor-saving devices. So complete is the electrical equipment that Mr. Lipps says he never has to strike a match. The house, as well as the other farm buildings, is cheerfully lighted by electricity. In winter, the rooms are made comfortable by electric

heat. Mrs. Lipps cooks on a Westinghouse three-plate electric range, uses an electric washing machine, electric hot point and flat irons, electric sweeper, and makes the morning waffles by electricity.

Water pressure for bathroom and kitchen is obtained through the Dayton system. A small motor operates a pump which raises water from a well in the cellar to an air cylinder. When the rising water develops sufficient pressure by compression of the air in the cylinder a switch opens and the motor stops. If the pressure drops, the switch closes and starts the motor. This automatic control is very satisfactory, according to Mrs. Lipps. A water heater attached to a large boiler makes hot water available when desired.

In the yard a 500-watt arc lamp illuminates the area surrounding the buildings. At the cattle corrals water is raised directly into the drinking troughs by means of a Meyers pump jack, operated by a small motor. This provides comparatively warm water during the coldest weather, and even in summer time the cattle prefer it to the ditch water in the pastures.

The rural power system also serves a number of electrically operated beet dumps at stations along the railroad lines, where sugar beets are loaded for shipment to the Burley and Paul factories of the Amalgamated Sugar Co. A large alfalfa meal mill also takes power from one of the rural lines. The grinding of hay and grain for stock feed at this mill is of great advantage to stockgrowers and feeders in the neighborhood. Many thousand sheep and cattle are fed on adjoining farms during the winter.

Poultrymen find electric service of benefit in their business. Many of them have become convinced that by making the short winter day longer for the hen, egg production is considerably increased; and it is a very common sight to see electric lights in the chicken houses. Many farmers are also using electric incubators and brooders.

Many other uses for power are found about the farms. Electric motors are used for feed grinding, ensilage cutting, churning, turning the grindstone and the circular saw, operation of grain fans and blacksmith blowers, running cream separators, sewing machines, and house fans. All these processes can be and are cheaply and efficiently carried out by Minidoka project water users with the help of electricity.

SLOW RATE OF DEVELOPMENT AND SETTLEMENT OF PROJECT LANDS

TWO facts have emerged clearly from experience gained in America, Australia, South Africa, and other countries where irrigation development has been proceeding on a large scale. These are:

(1) An individual requires time to develop his holding and can not be expected to pay the full charges during the first years of his occupation.

(2) To get the land subdivided and prepared for the settler, and to obtain and place the necessary number of settlers in occupation also requires time—in the case of large projects, many years.

Irrigation works are of such a nature that a very large proportion of the capital must be spent before the first acre can be irrigated. Storage dams, headworks, and

main canals must be built at the outset and must be of such a size as will ultimately be required to serve the full area. The land must also be purchased before construction is begun. The rate of expenditure can not, therefore, be kept in proportion to the rate of development.

It follows that extremely heavy interest charges must accrue during the period of construction and the first stages of development before any monetary return can be expected by the Government. If no interest were charged on public funds used for irrigation development, then of course the rate of progress would have no effect on the amount of redemption payments to be made by each settler, as only the capital expenditure would be returned to

the Government. It should not be overlooked, however, that a slow rate of progress with a slow rate of repayment of capital means that money is held up which might otherwise be used over again for other projects, and that further development is retarded. In America a capitalized fund has been established for irrigation development, and under such a system it is obvious that the rate at which new work can be undertaken depends on the rate at which the money is repaid.

In America no interest is charged on the capital utilized for irrigation development and there is a strong case for ignoring or at any rate reducing interest charges to a minimum in Government ventures on account of the great advantages derived indirectly from increased revenue under other headings. But America is alone in dealing with the matter in this way. Most other countries and certainly all private financiers must as a business proposition take into account the interest charges, and these are the serious factors in considering the effects of slow development.—*South African Irrigation Magazine.*

UMCOMPAHGRE TAME GRASS PASTURES

FOR the past four or five years, says H. A. Ireland, associate agriculturist of the Office of Demonstrations in Reclamation Projects, special attention has been paid to the value of permanent tame grass pastures on the Uncompahgre project, Colorado, for those farms on which dairy cattle and sheep are kept; and each year shows an increase in the acreage of this crop. Tests conducted by the State Experiment Station with different grass mixtures have given results leading to the recommendation of the following mixture, known all over the State as Morton's pasture-grass mixture, from Prof. Geo. E. Morton, of the experiment station, who has had charge of the tests.

	Pounds per acre
Orchard grass	15
Smooth brome grass	15
Meadow fescue	10
Timothy	6
Yellow sweet clover	4

This is recognized as extremely heavy seeding, but is recommended for the sake of an assurance of securing a full stand the first year. A pasture of this kind, reasonably well cared for, has been shown to be capable of carrying two head of mature dairy cows per acre for a season of five months or more, which is better than can be expected from an average acre of alfalfa fed as hay, besides being a considerable saving in labor and expense.

The accompanying illustrations show a pasture seeded the middle of April, 1924, on the farm of Wm. Duling, on Garnet Mesa, near Delta, Colo. The grass was seeded with a barley nurse crop which had to be mowed as the grass was too heavy by the time the barley was ripe to permit the use of a binder. On September 20, when these pictures were taken the grass stood 18 inches high in a perfect mat over the entire field.

Mr. Duling, who owns a small herd of registered Jersey cattle, is enthusiastic over the pasture idea and believes he has made a good investment.

Farming by irrigation in the United States on the part of the Anglo-Saxon race is of recent origin as compared with this practice in many foreign countries.



William Duling, (left), of Delta, Colo., in his irrigated pasture

CROP CONDITIONS ON THE PROJECTS

October, 1924

YUMA project, Arizona-California.—Approximately 70 per cent of the cotton had been picked and 14,000 bales had been ginned with prospects of a total of 20,000 bales. Several hundred acres of lettuce had been planted and growers were forming an organization. All orchards on the mesa were in very good condition.

Orland project, California.—The rain on October 5 occurred in time to save the citrus orchards from permanent damage. The crop as a whole, however, will be light. Alfalfa and wheat advanced in price.

and most of the crop had been marketed. Potato prices were low and much of the second-grade varieties was being sold for feeding cattle and hogs.

Boise project, Idaho.—A considerable portion of the hay crop sold at \$10 per ton in the stack. Most of the apple crop had been marketed. The price of clover seed advanced steadily to 23 cents per pound.

King Hill project, Idaho.—The sales of alfalfa seed will enable many of the farmers to meet their payments and finance them for the coming year, the crop in many cases running to \$100 and

fair to good results. Large quantities of beet pulp were being shipped to the project for feeding purposes. Final payment on October 15 for the 1923 beet crop brought the total price per ton to \$9.01 and put \$62,000 in cash in the hands of the project farmers. The initial payment for the 1924 crop was also made on the same date.

Milk River project, Montana.—Grain threshing and digging of potatoes and sugar beets were about completed. About 27 carloads of beets were shipped from the Malta division and about the same number from the Chinook division. Some hay was being baled and shipped.

Sun River project, Montana.—The alfalfa crop was better than in previous years, but grain crops were not up to the average.

Lower Yellowstone project, Montana-North Dakota.—The sugar-beet crop was about 80 per cent harvested. Other harvesting was virtually completed.

North Platte project, Nebraska-Wyoming.—About 90 per cent of the sugar-beet crop had been harvested. Alfalfa hay was selling at \$8 per ton in the stack. Virtually the entire crop will be fed on the project. The price of potatoes rose considerably, buyers offering \$1 per hundred-weight at the end of the month.

Newlands project, Nevada.—Harvesting of the third crop of alfalfa was completed and the yield was fairly heavy. Independent growers who handled their own cantaloupes received excellent returns, but otherwise there was considerable disappointment over the receipts owing to depressed marketing conditions at the height of the season. Considerable winter wheat was being planted.

Carlsbad project, New Mexico.—Cotton picking was in progress and about 9,000 bales had been ginned, representing 60 per cent of the crop in the Lower Pecos Valley. The crop will be the largest in the history of the project. Prices averaged about 23 cents per pound. The last crop of alfalfa had been harvested and the price averaged about \$20 per ton f. o. b. project.

Rio Grande project, New Mexico-Texas.—All crops were excellent and a good yield resulted from the fifth cutting of alfalfa. Warm weather greatly increased the cotton crop and 25 gins were working day and night. A compress and a cotton seed oil plant were also working to capacity. Cotton was selling at 23 cents per pound. It was predicted that the gross receipts from all farm crops and products this season will equal approximately 75 per cent of the entire cost of construction of the project.

Umatilla project, Oregon.—The fourth crop of alfalfa made good pasture for a considerable number of sheep.

(Continued on page 193)



A fine crop of cabbages grown on the Minidoka project, Idaho.

Grand Valley project, Colorado.—Where sugar beets were properly cared for on well fertilized soil excellent yields were obtained, in some cases exceeding 20 tons per acre. The average for the project, however, will probably be less than 10 tons. The yield of tomatoes for the season was about 50 per cent of normal.

Uncompahgre project, Colorado.—In general, good yields of sugar beets will be obtained. Hay should bring a good price, as it is anticipated that a considerable number of stock will be fed on the project this winter. The apple market was dull and the bulk of the crop went into storage. The price of wheat ranged from \$1.80 to \$1.90 per hundredweight,

\$200 per acre. Aside from the potato crop, which in general did not bring the returns anticipated, crops did very well and the majority of the farmers were much encouraged.

Minidoka project, Idaho.—There was a sharp decline in the sugar-beet production notwithstanding the heavy spring planting, owing to poor germination and damage by the white fly. A final bonus of 87 cents per ton on the 1923 crop was paid by the sugar company on October 16, bringing the total payments per ton to \$8.87. The yield and quality of potatoes were better than usual, but owing to low prices much of the crop was being stored.

Huntley project, Montana.—The sugar-beet harvest was nearly completed with

SETTLEMENT WORK OF GATEWAY CLUB

EARLY in 1923 a number of public-spirited citizens of El Paso decided upon an organization, financed by private subscriptions, which would advertise the resources of the Rio Grande project and the city of El Paso, and formed what is known as the "Gateway Club." About 800 individuals subscribed a total of \$150,000, to be used in settlement campaign and work.

Offices were established in the Chamber of Commerce Building in El Paso and the services of a national advertising firm obtained for consultation and preparation

of advertising copy and its circulation. Attractive booklets covering the resources and advantages to be found on the Rio Grande project were prepared, particularly with a view of omitting any exaggeration of facts, and with accurate statistics covering climatic, irrigation, crop, educational, and other features.

As a result of the national and other advertising, almost 40,000 inquiries have been received in the offices of the Gateway Club, and a large number of visitors called personally to obtain detailed information.

No lands are listed for sale by the organization. Virtually all of the visitors interested in the project are referred to the project office for detailed information on the works and lands of the project, and a large amount of free publicity for the Rio Grande project has been obtained by Manager August Wolf, of the Gateway Club, in the form of illustrated articles in daily and weekly publications. A large number of the project maps have been purchased by the organization for distribution.

Over 600 families were located on the project during the past year, owing to the efforts of this organization.

The Gateway Club is a nonprofit organization of citizens of El Paso and the Rio Grande project, with no lands to sell, but giving full disinterested information regarding farms and farming conditions.

AMERICAN FALLS BIDS REJECTED BY SECRETARY

Bids, under certain specifications, opened on October 20 for the construction of the American Falls Dam at American Falls, Idaho, were rejected by the Secretary of the Interior.

Following the rejection, instructions were issued for the advertising for new bids to be opened on December 20, 1924, for the construction under changed specifications which provide for the building of the foundation only of the river section of the dam.

The new sealed proposals will be received at the office of the Bureau of Reclamation at American Falls, Idaho, up to 2 o'clock on this date. The revised specifications provide for about 48,000 cubic yards of excavation, the placing of 41,000 cubic yards of concrete, together with the placing of approximately 600,000 pounds of reinforcing steel, 237,000 pounds of structural steel, and 1,700,000 pounds of cast-iron gates.

Two bids were received at the original opening on October 20, each covering different types of construction, one for a high dam to form a reservoir with a capacity of 1,700,000 acre-feet and the other for a low dam with a reservoir the capacity of which was to be 1,040,000 acre-feet.

Work under the new bids will be confined to the building of the base of the river section of the dam, the height to which the dam will be constructed to be later decided by the district. This change in plans will not delay final completion.

Bull associations have made it possible for farmers with small herds to obtain the services of sires with high-production ancestry.



In a Yakima apple orchard

CROP CONDITIONS ON THE PROJECTS

Continued from page 192)

Klamath project, Oregon-California.—Harvesting of virtually all crops had been completed and farmers generally were getting good prices for all products. Harvesting of the grain crop on Tule Lake leased land was well along, being handled by 10 large combined harvesters.

Belle Fourche project, South Dakota.—About 40 per cent of the sugar-beet crop remained to be harvested. The yield averaged about 9 tons per acre. The third cutting of alfalfa had been harvested and local prices ranged from \$5 to \$7 per ton in the stack.

Strawberry Valley project, Utah.—The hay crop was about normal, but wheat and sugar beets were below the usual average. In spite of this, however, the increased

prices will give the farmers at least 10 per cent more for their crops than last year.

Okanogan project, Washington.—Prices for the apple crop continued good.

Yakima project, Washington.—Virtually all crops had been harvested and good prices were received for all farm products. There was a general feeling of optimism among the farmers and on the whole conditions were much better than at a corresponding time last year.

Shoshone project, Wyoming.—Virtually all harvesting had been completed and threshing was well along. Much of the potato crop had been stored in anticipation of higher prices. The movement of hay was not very heavy owing to press of other work.

IDAHO POULTRYMEN ORGANIZE

FOLLOWING the salutary example set by poultrymen of the Boise Valley and neighboring counties in Oregon last January, the growers of southeastern Idaho recently completed the organization of a branch of the Idaho-Oregon Egg Producers, a purely cooperative marketing association operated and financed by the members. The southeastern branch on September 16 established headquarters and a candling station at Pocatello. The older organization conducts its business from Caldwell.

In the movement for organization of the new branch, the goal was set at 75,000 hens, but this mark has been passed and on September 1 the sign-up of 80,000 hens was completed. Each share of capital stock in the association is based on the ownership of 100 hens, subscribers agreeing to pay \$20 per share and to be bound by the marketing agreement, which provides that upon due notice all eggs and poultry produced by the members are to be sold through the organization, except eggs for hatching birds for renewal of flocks, and that marketing returns are to be distributed

on the basis of the quantities of eggs and poultry delivered to the association.

Subscribers to the southeastern branch began shipping on September 25. Eggs are handled at cost, the producers receiving the proceeds of all sales less necessary expense of marketing. Payments are made bi-weekly.

The association collects eggs in carload lots, grades them as to market demands, and ships to the best markets. Poultry products are stored as the season and demand requires.

On the Minidoka project 9,000 hens were signed up, together with 2,500 additional hens contributing to Burley and Rupert as the supply centers. The association will make it possible for Minidoka project poultrymen to receive for their eggs the best market prices, which it is estimated may be on an average 75 cents per hen over local prices. It will stimulate poultry production on the project, interest in which has already had a strong impetus during the past year, as shown by shipments averaging about a carload of eggs a month. Two years ago eggs were being shipped into the project.

The insistence upon high standards as to quality of product, method and manner of handling, packing and shipping eggs and poultry, and the culling of flocks to bring about high production will doubtless result in better returns to project poultrymen and general improvement in poultry breeding and poultry husbandry in southern Idaho.

POULTRY SHOULD HAVE COMFORTABLE QUARTERS

It never pays to overcrowd hens. They need a comfortable house, dry and roomy, with plenty of fresh air and sunshine. How to give them all this is told in Farmers' Bulletin 1413, Poultry House Construction, recently issued by the United States Department of Agriculture.

A plain shed-roof house is most economical, and most satisfactory. It should be so arranged that it will be easy to clean and for general convenience.

It is easier to keep the birds healthy, and to reproduce the stock under the colony system, if they are allowed free range. Breeding stock, especially growing chickens, should have plenty of range. Hens used solely for the production of market eggs may be kept on a very small area.

MODERN
POULTRY HOUSE



PULLETS
IN
LAYING HOUSE

MINIDOKA PROJECT
IDAHO

CONSTRUCTION OF HUBBART DAM, FLATHEAD PROJECT

This dam, which was begun July 1, 1922, and completed December 6, 1923, has an average height of 90 feet and blocks a narrow canyon, forming a reservoir of 12,000 acre-feet. The cost is approximately \$310,000

THE Hubbart reservoir constructed by the Bureau of Reclamation for the Flathead (Indian) project, Montana, is located in the narrow valley of the Little Bitterroot River 8 miles above the diversion for the canal system. It has a drainage area of 89 square miles of low-lying mountains, heavily timbered. The capacity of the reservoir is 12,000 acre-feet.

The dam site was selected at a point where the river flows through a comparatively narrow canyon with almost vertical cliffs of quartzite rock rising on both sides to a height of about 250 feet. The design of the dam is a variable radius arch. The top length is somewhat over 500 feet and the height from the rock floor of the canyon to the crest of spillway averages 90 feet. The greatest height of the dam taken from the bottom of an old channel found in the river bed to the top of parapet is 131 feet. The thickness of the concrete in the dam at bottom is approximately 24 feet; at elevation 3140, 18 feet; and at elevation 3205, 5 feet, which thickness is retained to the top of the dam at elevation 3222.5. The spillway crest has a length of 265

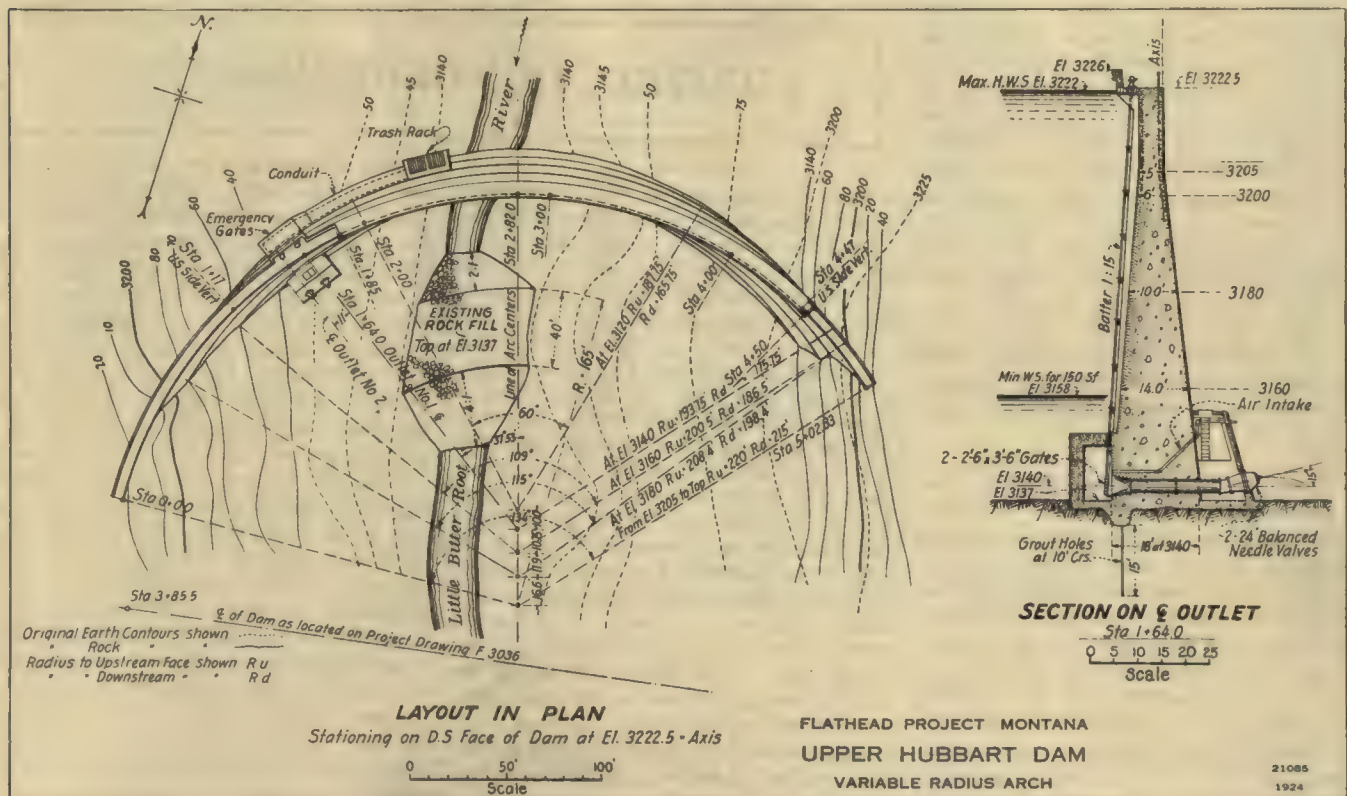
feet and provides for handling a flood flow of 5,000 cubic feet per second in safety. The upper 25 feet of the dam is reinforced; the remainder is plain concrete. Contraction joints were made at 50-foot intervals.

The foundation of the dam in the floor and sides of the canyon was grouted to prevent seepage through seams of the rock. Holes 2 inches in diameter 15 feet deep were drilled into the rock at the upstream toe at intervals of 10 feet. Grouting was done with a standard machine operated under 80 pounds air pressure. This machine has a tank 24 inches in diameter by 36 inches long. Three sacks of cement were used at a batch. Mixing was done inside the machine by the use of air for stirring. On account of the fineness of the seams, no sand was used in the mixture. Proportions of water to cement varied according to the rapidity with which the cracks absorbed the grout. Sixty-eight holes were grouted and 440 sacks of cement used. The most cement used in any one hole was 30 sacks.

Plain concrete placed amounted to 14,698 cubic yards and reinforced to 2,673 cubic yards; 77,480 sacks of cement and

61,000 pounds of reinforcing steel were used. Practically all of the concrete was placed during the months of April to November, 1923. A 1:2½:5 mixture was used and wherever possible with economy plum rock was placed in the concrete. Cement was hauled 16 miles from the nearest railway point. Gravel and sand were obtained from a gravel bar in the reservoir one-half mile above the dam site. A gravity type screening plant was erected at the pit. Material was excavated and taken to the top of this plant by means of a three-fourths cubic yard drag-line bucket operating on a 500-foot slack line cableway for which a steam hoist furnished power. Over size was eliminated by a grizzly at the top of the plant. Water from a ditch taking out of one of the tributaries of the river and located about 200 feet higher than the plant was delivered by pipe line to the screens for washing of the materials that went through. Washings were removed from the plant through portholes in the side of the sand bin. All of the sand and gravel needed was taken from an area of about 1 acre. The anchors for the slack-line cableway were moved as neces-

(Continued on page 196)



SETTLEMENT PROBLEMS ON AUSTRALIAN PROJECTS

An article in the South African Irrigation Magazine, commenting on the Murrumbidgee irrigation project in New South Wales, Australia, states that probably no State has gone so far as the Government of New South Wales in advancing capital to settlers and in providing for cooperative undertakings, such as butter, cheese, and canning factories for the benefit of the settlers. Profiting by the experience of Victoria, where the State did not control speculation, this project was launched to remedy all the evils by (1) acquiring the land at cheap prices before development; (2) limiting the size of farms to the capabilities of the individuals; (3) insisting on residence by the settler; (4) not alienating the land, but giving perpetual lease; (5) making liberal advances to settlers; (6) making easy graduated charges in the first years; (7) erecting cooperative factories and building model townships, etc.

Nevertheless, although the project was designed for the irrigation of more than 200,000 acres, only one-fourth of that area was irrigated in 1922, ten years after the first settlement began. The total returns for land and water charges during 1921 were only \$258,000, which did not meet direct expenditures connected with administration, let alone interest charges.

The conclusion is obvious, therefore, that the real problem is to settle up an area rapidly on sound financial lines and help to bring on the settlers rapidly to such a stage that the fixed charges can be paid by them in full. "It is certain, however, that the process will in every case take a good many years and during these years it is unfair to balance interest charges against revenue. So long as ample allowance is made for these processes in assessing the land and water charges, and cooperative ventures are soundly planned with compulsory membership, there seems no reason to despond over the success of irrigation settlement."

Under the Colorado irrigation act (Rev. Stat. 1908, secs. 3440-3494), providing that interest and principal of bonds of an irrigation district shall be paid from a special "bond fund" to be kept separate, and consisting of the proceeds of an annual assessment on the lands in the district, which may be assessed to the extent necessary to meet payments of interest and principal as they come due, a bondholder is limited to such fund and can not subject other funds of the district to payment of his bonds. (Gas Securities Co. v. Nile Irrigation Dist. (Colo.), 293 Fed. 365.)

RECLAMATION FUND PROFITS FROM ACT

Receipts collected by the Government under the general leasing law, passed in 1920, providing for the development of oil, gas, and coal fields on the public domain have reached the grand total of \$34,866,837 up to the end of the fiscal year, according to a tabulation made at the Interior Department. These figures are exclusive of receipts from the naval petroleum reserves.

Distribution of this fund has been made in the following manner in accordance with the law: \$11,941,171 to the several States within which the minerals were found on public lands; \$19,422,126 to the reclamation fund; and \$3,503,558 into the Federal Treasury.

PONTINE MARSHES TO BE RECLAIMED

The Pontine region, southwest of Rome, Italy, is a broad plain extending over an area of 148,260 acres. Reclamation had been going on in this region since the beginning of the Christian era.

The report of the Royal Commissioner states that before long 4,942 acres of waste land in the marshes will be permanently reclaimed, and that operations are being conducted at present on the land which has been divided into three lots for reclamation purposes. It is now estimated that the work, fixed at \$2,428,725 in 1918, will cost \$11,700,000. When this project is completed, it will do much toward improving the health conditions of the entire region and will be an important factor in the colonization and agricultural problems of the district.

ACCOUNTING SYSTEM FOR POULTRY FARMS

A definite record of expenditures and receipts is one of the greatest needs of many poultry keepers. Without it the poultry man is hardly able to determine the extent of success or failure of his work.

Farmers' Bulletin 1427, recently issued by the Department of Agriculture, con-

tains a simple system of poultry accounts by which the necessary records can be easily kept. This system may be used either by the poultry keeper who has a small flock or by the commercial poultry man.

A study of his records kept according to this system will enable the poultry man to determine which parts of the operation of the farm are profitable and where the costs are too much.

CONSTRUCTION OF HUBBART DAM

(Continued from page 195)

sary to cover the area and deliver material to screening plant. The washed sand and gravel was hauled by dump wagons to a storage bin located above the mixing plant from which it was run by gravity through measuring boxes into a one-half cubic yard steam power mixer. From the mixer the concrete was dumped into a hopper and from the hopper into a three-fourths-yard side dump car running on a track 100 feet to the hoisting tower located at the middle point of the dam. A 28 cubic foot capacity hoist bucket operated by a steam hoist raised the concrete and dumped it into a 42 cubic foot receiving hopper, from which it was poured into one-half-yard cars with swivel dump running on a timber trestle built against the upstream face of the dam. This trestle was raised by 11-foot lifts as the work on the dam progressed and served as a working platform necessary on account of the very thin section of the dam. Concrete was delivered to the section of the dam from the trestle through metal chutes.

Two 24-inch cast-iron outlet conduits provide for taking water through the dam. These are covered by sliding gates 2 feet 6 inches by 3 feet 6 inches on the upstream end with stems leading to operating hoists placed on the top of the dam. Two 24-inch balanced needle valves on the downstream end of the conduits furnish the regular operating control. A 6-inch cast-iron pipe through the dam with operating valves provides for taking water into the outlet conduits to equalize the pressure against the sliding gates before operation. An operating house is built of concrete over the outlets and valves on the downstream side of the dam. The outlet works are located to the west of the spillway crest to avoid the overflow. To prevent the possibility of slides from the steep slope on the west side of the canyon interfering with outflow from the reservoir, the entrance and trash rack structure is located near the middle point of the dam and is connected with the conduits by a rectangular concrete passageway.

INDEX NEW RECLAMATION ERA. VOLUME XV

For the year 1924

Page numbers for separate issues

No.	Month	Page	No.	Month	Page
1.	January	1-16	7.	July	101-116
2.	February	17-32	8.	August	117-132
3.	March	33-48	9.	September	133-148
4.	April	49-64	10.	October	149-164
5.	May	65-84	11.	November	165-180
6.	June	85-100	12.	December	181-196

A

	Page
Accounting system for poultry farms	196
Advertise project, plan proposed to	64
Aeroplane view of department building	122
Agricultural and economic development of projects	151
census, 1924, project annual	184
cloud has silver lining	132
program for 1924	29
Agriculture basis of each commonwealth	6
Alfalfa for lambs	46
meal mill aids Orland farmers	31
the eelworm disease a menace to	48
Almond industry on Orland project	10
American Falls bids rejected by Secretary	193
reservoir, construction of, assured	176
Animal disease breaks out	60
Apple scald, control, and improve product	64
Australia, assistance to settlers in	135
launches irrigation scheme	162
meets similar problems	108
points way in reclamation laws	129
Australian projects, settlement problems on	196

B

Baker project, Oregon, agricultural and economic phases of	166
Balance sheet June 30, 1923	16
Barn, a well-planned, saves time and labor	47
Beadle, J. B., Where the money comes from	112
Belle Fourche project, appoints manager of	62
resolutions	34
Black Canyon Dam movie plot scene	45
Blake, Minnie E., The reclamation rancher (poem)	116
Blake, P. F., Celery growing on the Lower Yellowstone project	142
Boise, echoes from	11
Bookkeeping, standard methods of, help farmers	38
Bridge grafting for fruit trees	44
British Oversea Settlement report on cost of farm development	152
Brook, H. H., death of	32
Buffalo Bill started project	62

C

	Page
Canadian pointers for reclamation projects	119,
	138, 153
Canning factories	46
Cantaloupes make good returns for farmers	9
Celery growing on the Lower Yellowstone project	142
Census, agricultural, 1924, project annual	184
Check, largest, received by Reclamation Bureau	7
Cherries look good to Flathead growers	44
Chronology of reclamation	53
Colonization, Commissioner Mead urges planned	149
Colorado beets, \$75 per acre profit from	21
Colorado River, definite Federal policy on, urged	51
Colorado storage engineers selected	27
Columbia Basin report	31, 90
Commissioner Davis returns to desk	27
Mead returns from trip	144
Mead visiting projects	110
Mead's address at the Denver office	91
Committee of Special Advisers on Reclamation, extracts from report of	67, 68, 70, 71, 72, 73, 74,
	75, 76, 77, 78, 79, 87, 88, 89, 90
Contentment depends on social conditions	130
Cooperation in the marketing of poultry products	111
Cooperative marketing on Strawberry Valley project	8
opportunities for rural-minded people	107
reclamation between State and Nation	174
Corrugation method of irrigation	6
Cost of farm development of an irrigation project	152
Cotton, growing upland, on Arizona projects	121
Country Gentleman, Doctor Mead writes for	184
Cow-testing association pays	120
Cowiche creamery pays out \$78,000 per year	32
Cows, yield from, is based upon feeding	59
Crop conditions on the projects	11, 30, 41, 59, 97,
	124, 144, 159, 164, 179, 192

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D		G	
	Page		Page
Dairies aid Newlands youngsters.....	95	Gateway Club, settlement work of.....	193
Dairy advantages on Newlands project.....	47	Get out or get in line.....	2
barn needs good ventilation.....	128	Grand Valley bulls on Uncompahgre farms.....	126
center should be in West.....	93	Gravel screening done efficiently at Tieton.....	48
herd helps the farmer.....	178		
industry, helping the, by a loan association.....	39	H	
production not entire gain.....	139	Harding memorial, the.....	8, 50
products total \$500,000 from project.....	21	Henderson, R. E., successful farmer.....	154
stock, get some.....	36	Hens yield revenue on Uncompahgre farm.....	28
Dairying, pastures are essential for successful.....	109	Herd testing association finishes first year.....	48
Dairymen's Mutual Loan Association, Lower Yellowstone project.....	188	Hogs, hot-weather hints for shipping.....	128
Deferred payments, bill providing for.....	9	Holstein bulls loaned by Huntley to Shoshone.....	22
Development and settlement of project lands, slow rate.....	191	Homes of farm mothers a study of wide im- portance.....	4
Director of Reclamation Service, bill providing for.....	9	Hubbard, Elbert, Get out or get in line.....	2
District, private, wants extension.....	44	Hubbart Dam, construction of, Flathead project.....	195
Diversified farming means extra profits.....	123	Humus, importance of.....	99
E		I	
Economic investigation of Spanish Springs project.....	181	Idaho poultrymen organize.....	194
Electricity, cheap, serves Minidoka water users.....	190	Incubator, attend the, and produce more eggs.....	46
use of, on an English farm.....	158	India, water users in, aided by Government.....	117
Economic and agricultural development of projects.....	151	Indian projects, operation of, transferred.....	31
Economies in personnel, travel, and printing.....	156	Inspection division created.....	146
Eelworm disease a menace to alfalfa.....	48	Intensive farming vitally necessary.....	132
Eggs, marketing.....	110	Intercropping on the Salt River project.....	146
Electric service for agriculture, the problem of.....	24	Irrigated pastures bring good returns on projects.....	43
Electricity helps Minidoka project.....	42	Irrigation demands good crop rotation.....	180
Excess land ownership should be discouraged.....	96	development and settlement.....	101
		district has many advantages.....	64
		district subject of hearing.....	25
		law, decisions.....	98
		law, western.....	63
		practice.....	37, 82
		the corrugation method of.....	6
		the spirit of.....	17
F		K	
Fact Finders' report reviewed by South Africans.....	186	Kreutzer, George C., Economic and agricultural development of projects.....	151
Farm advisers needed for success.....	106	Plan of settlement for an irrigation project.....	133
cost accounts help farm business.....	163		
credit and farm advice on reclamation proj- ects.....	118	L	
Farmers' condition shows improvement.....	163	Laguna Dam repair cost only 0.4 per cent a year.....	189
Farmers solve farm management problem.....	44	Lamb feeding, winter, brings good returns.....	164
Farming, what type of, should you follow.....	47	Land and water law.....	148
Federal farm loan system designed to help farm- ers.....	58	transfers a serious problem.....	106
Fertilizer, value of.....	48	Law decisions, irrigation.....	45
Field mice, control, and save orchards.....	131	Law notes.....	13, 148, 161
Financial requirements under various plans.....	182	Legislation proposed for new reclamation proj- ects.....	50
statistics, project.....	99	recent Federal irrigation.....	113
Fitch, Charles H., retires from bureau.....	163	Lewis, A. D., Reclamation difficulties of other countries.....	105
Flathead:		Livestock and crop rotation aid land.....	164
project, dairy stock increase on.....	32	feeding methods, how to improve.....	141
waters, engineers in report on.....	31	to harvest crops, using.....	126
Foot-and-mouth disease breaks out.....	60		
Foreign land policies point way for projects.....	135		
Fort Laramie Canal, North Platte project.....	146		
Freight rates, study of products beats.....	160		

	Page		Page
Lloyd barrage and canals project, India.....	178	Pontine bridges to be reclaimed.....	196
Loan Association (Mutual), project dairymen's,		Population, increase, and diversify crops.....	47
Lower Yellowstone project.....	188	Potato crop should be increased by spraying.....	48
Loan Association aids dairy farmers.....	130	growers, Yakima, plan to reduce losses.....	16
Lower Yellowstone project, celery growing on		growing, whole or cut sets in.....	180
the.....	142	Poultry business, need specialization in.....	62
Dairymen's Mutual Loan Association on.....	188	farms, accounting system for.....	196
Lytel, J. L., acknowledges letter from Secretary		mate your, scientifically.....	15
and Commissioner.....	180	problems, February.....	28
		products, cooperation in the marketing of.....	111
M		should have comfortable quarters.....	194
Manure, put on land as soon as possible.....	130	Poultrymen organize, Idaho.....	194
Marketing accidentally means poor marketing.....	180	President Coolidge backs irrigation develop-	
cooperative, on Strawberry Valley project.....	8	ment.....	165
essential elements in cooperative.....	132	President's relief measure passes Senate.....	49
Mead, Dr. Elwood.....	65	Principles of irrigation practice outlined.....	56
begins work on advisory committee.....	14	Project managers may not own local farms.....	16
Farm credit and advice on reclamation		Promise, a.....	4
projects.....	118	Public land farm units are opened.....	30
Land settlement and irrigation develop-		Publication, an improved.....	42
ment.....	101	Purchase discounts assist water users.....	100
urges planned colonization.....	149	Pure-seed growers unite for quality.....	131
writes for Country Gentleman.....	184		
Membership loyalty to the organization.....	128	R	
Mexico aids irrigation.....	180	Rabbits.....	48
Milk River resolutions.....	27	Reclamation, a chronology of.....	53
Mineral leasing law helps reclamation.....	147	bills.....	78
Minidoka project, electricity helps.....	42	difficulties of other countries.....	105
sugar-beet industry on.....	187	failures, the cause of.....	24
Minidoka water users are served cheap electric-		fund profits from act.....	196
ity.....	190	fund receipts.....	112, 122
		law decisions.....	127
N		notes, savings effected by elimination of	81
New Reclamation Era.....	70	on business lines.....	173
Newell, R. J., sand trap.....	147	policy, water users request change in.....	35
Newlands project dairy advantages.....	47	project, legislation proposed for new.....	50
turkeys a valuable crop on the.....	92	projects, notes from.....	26, 61
Newnham, James, Klamath project, financial		Reorganization saves \$103,000.....	122
success of.....	146	Relief act, 1924, and regulations.....	85
North Platte project, Fort Laramie Canal.....	146	measure passes Senate.....	49
sweet clover pasture on the.....	57	Reorganization of bureau.....	83
Numbers, H. O., Mate your poultry scientifi-		operations.....	104
cally.....	15	Repudiate debts, no sentiment among farmers	
		to.....	21
O		Rio Grande farmers see good melon year.....	145
One-crop system may be failure.....	131	Riverton project, construction of Wind River	
Organization chart.....	84	diversion dam.....	12
Orland project again pays up on due date.....	15	returns 8,000 acres of unused land.....	41
almond industry on.....	10	Rotation, irrigation demands good crop.....	180
rain breaks drought on.....	175	of crops, ten good reasons for.....	23
P		S	
Pastures are essential for successful dairying.....	109	Salt River land value raised \$15 per acre.....	162
irrigated, bring good returns on projects.....	43	Salt River project check largest received by	
tame grass, Uncompahgre.....	191	bureau.....	7
Pictorial lessons in practical irrigation.....	5,	intercropping on the.....	146
20, 36, 52, 81, 123, 139, 155, 177		to have public park.....	173

	Page		Page
Sandy soils on Umatilla project, control of.....	185	Sweet clover makes a good pasture crop.....	130
San Luis Valley drain under consideration.....	29	pasture on the North Platte project.....	57
Sand trap helps to clear canal of sand and silt.....	147		
Secretary indorses extension measure.....	19	T	
eulogizes report.....	69	Tasmanian land laws shut out speculators.....	178
Seed, save home-grown.....	106	Tax, per capita, burden is heavy on farmers.....	163
Seepage water, Government wins suit concern- ing.....	25	Tenant farmers buy farms of their own.....	16
Settlement and irrigation development.....	101	Tenants, difficult for, to become farm owners.....	132
plan of, for an irrigation project.....	133	Tracy, Francis G., A settler tells his story.....	7
problems on Australian projects.....	196	Tree planting, encourage.....	116
Work of Gateway Club.....	193	Tule Lake survey ordered completed.....	100
Sheep, purebred, bring good profit to owner.....	14	Turkey raising, the business of.....	129
Silo, advantages of the trench.....	155	Turkeys a valuable crop on the Newlands proj- ect.....	92
filling time on projects demands preparation.....	120		
of one form or another is a farm necessity.....	23	U	
poisonous gases formed in.....	155	Umatilla project, control of sandy soils on.....	185
Soils, sandy, on Umatilla project, control of.....	185	has famous honey producer.....	32
South Africa, development of irrigation in.....	136	Uncompahgre breezes (poem).....	126
meets irrigation troubles.....	119	farmers boost sugar beets.....	21
rate of development and settlement in.....	191	farms, Grand Valley bulls on.....	126
South African irrigation act needs changes.....	137	poem, optimism reflected in.....	116
South Africans review fact finders' report.....	186	project, spirit of optimism noted on.....	143
Spanish Springs project, economic investigation of.....	181	tame grass pastures.....	191
Special advisors continue reclamation analysis.....	3		
hear water users in Salt Lake City.....	19	V	
public hearings of, draw big crowd.....	33	Vegetables, diseases and insects of garden.....	64
Special Advisory committee report scheduled in April.....	49	Vision for 1924, a new.....	1
State and Nation, cooperative reclamation be- tween.....	174		
Strawberry Valley project, cooperative market- ing on.....	8	W	
sugar beets on the.....	95	Walter, R. F., made Acting Chief Engineer.....	165
Success as farmer, qualifications for.....	162	Water users laud recent report.....	96
examples of financial.....	145, 154	users relieved by bill.....	40
Sugar-beet growing in Western States.....	173	users request change in reclamation policy.....	35
growing, suggestions on.....	55	Weymouth, F. E., leaves Bureau of Reclamation.....	160
industry on Minidoka project.....	187	Whitewash for dairy and poultry houses.....	131
Sugar beets on Strawberry Valley project.....	95	Widtsoe, Dr. John A., Principles of irrigation practice.....	37
pay water user.....	29	Wind River, diversion dam, construction of.....	12
Sun River Valley fair.....	178	Windbreak as a farm asset.....	81
Sunnyside Valley Irrigation District, resolutions concerning new projects.....	25	Woman's part in the work of reclamation.....	96
Survey of reclamation projects planned.....	117	Work, Hubert, Homes of farm mothers a study of wide importance.....	4
		Y	
		Yakima potato growers plan to reduce losses.....	16
		Yuma Mesa grapes show great promise.....	164
		project pledges cooperation.....	86

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Umatilla, McKay Dam.....	McKay Dam, Oreg.....	R. M. Conner ⁴	C. B. Funk.....	W. S. Gillogly.....	H. L. Holgate.....	Portland, Oreg.
Yakima, Tieton Dam.....	Rimrock, Wash.....	Walter Ward ¹	M. J. Gorman.....	C. F. Williams.....	do.....	Do.

¹ Project operated by Salt River Valley Water Users' Association.

³ General Superintendent and Chief Engineer. Construction Engineer

⁴ Superintendent of Construction.

The NEW RECLAMATION ERA is issued every month by the Bureau of Reclamation of the Department of the Interior, Washington, D. C. It is printed by the Government Printing Office, Washington, D. C.

The NEW RECLAMATION ERA is sent regularly to all water users on the reclamation projects under the jurisdiction of the bureau who wish to receive the magazine. To other than water users the subscription price is 75 cents per year, payable in advance. Subscriptions should be sent to the Chief Clerk, Bureau of Reclamation, Washington, D. C., and remittance in the form of postal money order or New York draft should be made payable to the Chief Disbursing Clerk, Department of the Interior. Postage stamps are not acceptable in payment of subscription.

—COOPERATION

WE HEAR this word continually. We hear it everywhere. It is a mighty word. It is of sufficient importance and strength to form a permanent foundation for any organization; but if it is a word only, and one that is reiterated so often that it becomes meaningless, its effectiveness will continue to diminish until it will be a source of weakness rather than strength and a byword for the scoffer. We must do something besides talk about cooperation. We must cooperate in fact, if we wish to build with permanence and security.

—From an address by L. H. Mitchell, Superintendent of the Shoshone Irrigation Project, Washington, before the Garland Community Club

